UNIVERSIDAD CATÓLICA BOLIVIANA SAN PABLO SEDE TARIJA

DEPARTAMENTO DE CIENCIAS DE LA TECNOLOGÍA E INNOVACIÓN

CARRERA DE INGENIERÍA MECATRÓNICA

TITULO DE TRABAJO (ESCRITO EN UN LETRA MAYÚSCULA REDACTADO EN UN MÁXIMO DE 3 LINEAS ALINEADO Y JUSTIFICADO TAMAÑO T16)

POSTULANTE: NOMBRE DEL AUTOR

Trabajo de proyecto de grado (lo que corresponda según Reglamento de modalidades de graduación) presentado en consideración de la Universidad Católica Boliviana "San Pablo, como requisito para optar el Grado Académico de Licenciatura en ingeniería mecatrónica

TARIJA-BOLIVIA

2025

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Titulo cada inicio de palabra en mayuscula

1st Given Name Surname
dept. name of organization (of Aff.)
name of organization (of Aff.)
City, Country
email address or ORCID

Resumen—This document is a model and instructions for LaTeX. This and the IEEEtran.cls file define the components of your paper [title, text, heads, etc.]. *CRITICAL: Do Not Use Symbols, Special Characters, Footnotes, or Math in Paper Title or Abstract.

Index Terms—component, formatting, style, styling, insert.

I. Introduction

This document is a model and instructions for LaTeX. Please observe the conference page limits. For more information about how to become an IEEE Conference author or how to write your paper, please visit IEEE Conference Author Center website: https://conferences.ieeeauthorcenter.ieee.org/.

I-A. Maintaining the Integrity of the Specifications

The IEEEtran class file is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

II. Prepare Your Paper Before Styling

Before you begin to format your paper, first write and save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sections II-A to II-H below for more information on proofreading, spelling and grammar.

Keep your text and graphic files separate until after the text has been formatted and styled. Do not number text heads—LaTeX will do that for you.

II-A. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, ac, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

II-B. Units

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive".
- Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.
- Do not mix complete spellings and abbreviations of units: "Wb/m^2" or "webers per square meter", not "webers/m^2". Spell out units when they appear in text: ". . . a few henries", not ". . . a few H".
- Use a zero before decimal points: "0.25", not ".25". Use "cm^3", not "cc".)

II-C. Equations

Number equations consecutively. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

$$a + b = \gamma \tag{1}$$

Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(1)", not "Eq. (1)" or "equation (1)", except at the beginning of a sentence: "Equation (1) is . . ."

II-D. LaTeX-Specific Advice

Please use "soft" (e.g., `\eqref{Eq}`) cross references instead of "hard" references (e.g., `(1)`). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don't use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in LATEX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you've discovered a new method of counting.

BIBTEX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BIBTEX to produce a bibliography you must send the .bib files.

LATEX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LATEX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

II-E. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [7].

II-F. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

II-G. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

II-H. Figures and Tables

II-H0a. Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 1", even at the beginning of a sentence.

Cuadro I
TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	*Subhead*	*Subhead*
copy	More table copy[a]		

[a]Sample of a Table footnote.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In
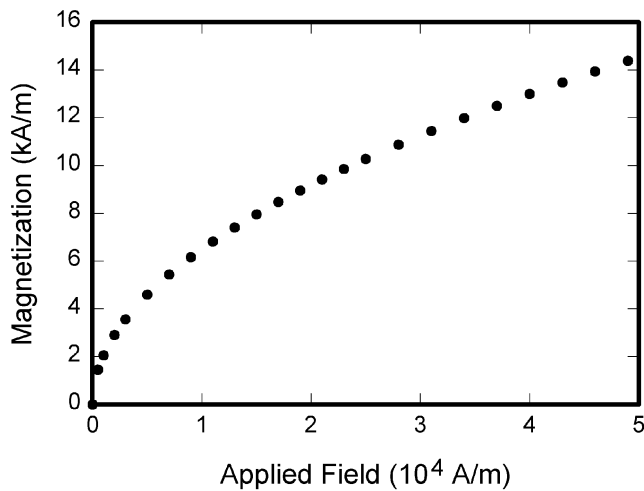
Figura 1. Example of a figure caption.

the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

Please number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] was the first ..."

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors' names; do not use "et al.". Papers that have not been published, even if they have been submitted for publication, should be cited as "unpublished" [4]. Papers that have been accepted for publication should be cited as "in press" [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

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Resumen Ejecutivo

Generalmente su extensión es igual a una plana, con una extensión de 150 a 200 palabras.

El mismo debe contener la información más importante de todo el trabajo, como: breve descripción del problema, principales conclusiones o hallazgos del análisis, principales características de la propuesta, y conclusiones del documento.

Al final del resumen se debe incluir entre tres (3) a cinco (5) palabras claves que definen el contenido del trabajo.

Abstract

Resumen Ejecutivo en formato inglés, siguiendo las misma estructura que el anterior apartado.

Índice general

Índice de figuras

Índice de cuadros

1. Análisis del problema

Aquí inicia el desarrollo del documento.

1.1. Introducción

Breve presentación del tema del proyecto y su relevancia

1.2. Descripción del problema

Detalle especifico del problema que se va a abordar, destacando su importancia.

1.3. Formulación del problema

Planteamiento claro y conciso del problema del proyecto.

1.4. Pregunta de investigación (opcional)

Pregunta principal que el proyecto busca responder.

1.5. Objetivos del proyecto

- **Generales:** expresan las intenciones educativas de un proyecto curricular, de un plan de estudios, o de una asignatura. Son los propósitos más amplios que persigue un programa en cada nivel y su cumplimiento está en función del tiempo de duración de la carrera o de la asignatura dentro de la estructura y organización curricular.

- **Particulares:** se derivan de los generales de la asignatura y corresponden a cada una de las unidades del programa analítico de la misma. Aquí se precisan las intenciones educativas de una parte del contenido (sistema de conocimientos y sistema de habilidades), que se aborda, lo cual debe conducir al logro de los objetivos generales de la asignatura en su conjunto y de los objetivos curriculares del Plan de Estudios.

- **Específicos:** se derivan de los objetivos particulares y corresponden a los de las clases de cada unidad didáctica, por lo que existe un mayor grado de concreción de las intenciones educativas. El cumplimiento de estos objetivos debe conducir al logro de los objetivos de la unidad del programa de la asignatura, como parte de la estructura curricular y contribuir al cumplimiento de los objetivos del plan de estudio.

¿CÓMO REDACTAR OBJETIVOS?

1. Todo objetivo inicia su redacción utilizando un verbo en forma infinitiva, así se precisa el propósito del objetivo con más claridad. Este verbo describe el qué del objetivo.Por ejemplo:

Identificar . . . .

Comparar . . . .

Aplicar . . . .

Diagnosticar . . . .

Describir . . . .

Reflexionar. . . . .

Fundamentar . . . .

2. Para completar el enunciado del objetivo se da respuesta al PARA QUE del propósito. Es decir se explica la finalidad del objetivo. Por ejemplo:

. . . con el fin de . . . .

. . . . para. . . .

3. Termina enuciando el CÓMO se logrará el objetivo. Por ejemplo:

. . . . mediante . . . .

. . . . a través de . . . . .

. . . . utilizando . . . . .

1.5.1. Objetivo general

Meta del proyecto.

1.5.2. Objetivos específicos

Metas secundarias que ayudan a alcanzar el objetivo general.

1.6. Delimitación del proyecto

Definición del alcance y las limitaciones del estudio.

1.7. Justificación

Explicación de la relevancia y la importancia del proyecto, y como contribuirá al campo tecnológico.

2.   Marco Teórico

2.1.   Antecedentes y referencias

Información previa y estudios anteriores relevantes al tema del proyecto.

2.2.   Estado del arte

Resumen y análisis de las investigaciones mas recientes y relevantes en el área, identificando tendencias y vacíos en el conocimiento.

2.3.   Desarrollo de teorías y modelos

Descripción de las teorías y modelos que sustentan el proyecto.

2.4.   Definición de términos básicos

Explicación de términos técnicos y conceptos específicos utilizados en el proyecto

3. Marco tecnológico

3.1. Tecnologías utilizadas y tendencias

Identificación de tecnologías, sus tendencias y su impacto potencial en el proyecto.

3.2. Comparación de tecnologías

Análisis comparativo de diferentes tecnologías disponibles.

4. Marco metodológico

4.1. Metodología

Descripción detallada del enfoque y métodos utilizados para llevar a cabo el proyecto, incluyendo técnicas de recolección de datos y análisis.

4.2. Plan de trabajo

Cronograma y fases del proyecto, especificando actividades y tiempos estimados para cada etapa.

5. Marco legal (opcional)

6. Ingeniería del proyecto

7.   Conclusiones y recomendaciones

Bibliografía

Aquí van las referencias en formato APA 7ma edición.

Anexos

Aquí se pueden agregar anexos.

Figura 1

Título breve pero descriptivo de la imagen

Nota: Se incluye la nota únicamente cuando es necesaria para aclarar información adicional.