

# Grammar

It is tempting to suggest that grammar is of secondary importance in technical writing. Perhaps the equations, figures, tables, and numbers speak for themselves. The contrary is true: grammar contributes strongly to the clarity, quality, and repute of a paper. Although this may seem unfair to academics that have English as a second language, such as the author of this document, there exist no valid excuses. Such circumstances only strengthen the need to learn the language and the rules of grammar, some of which are summarized in the following.

## Parts of Speech

Each word in a sentence is classified according to its function in the sentence. Often, several words are combined to serve one function. The word classes—called parts of speech—are listed in the following:

- **Noun**
  - A noun indicates a thing, concept, person, place, etc.
  - Examples: *analysis, credibility, wood, Peter, Vancouver*
  - Nominative noun: *Peter*
  - Possessive noun: *Peter's*
- **Adjective**
  - An adjective modifies a noun
  - Examples: *fast, credible, small, blue, one*
  - Comparative form: *faster*
  - Superlative form: *fastest*
- **Pronoun**
  - A pronoun refers to another noun; it can substitute for a noun
  - Indefinite pronouns: *anybody, everybody, somebody*
  - A pronoun has three cases: Nominative, possessive, objective:

	Nominative	Possessive	Objective
<i>Singular personal pronouns</i>			
First person	I	my, mine	me
Second person	you	your, yours	you
Third person	he, she, it	his, her, hers, its	him, her, it
<i>Plural personal pronouns</i>			
First person	we	our, ours	us
Second person	you	your, yours	you
Third person	they	their, theirs	them
<i>Relative or interrogative pronouns</i>			
Singular	who	whose	whom

Plural	who	whose	whom
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- **Verb**

- A verb indicates an action, event, or state
- Examples: *work, analyze, and develop*
- The mood of a verb is one of the following:
  - Indicative: expressing a statement
  - Imperative: expressing a command
  - Subjunctive: expressing doubt, condition, wish, or probability
- Verbs are classified as regular if they conjugate according to the table below. Otherwise they are irregular. The table is generated with the third person singular pronoun “it” because it is most common in technical writing.

Tense	Simple form	Progressive form
		<i>Active voice</i>
Present	it shows	it is showing
Past	it showed	it was showing
Future	it will show	it will be showing
Present perfect	it has showed	it has been showing
Past perfect	it had showed	it had been showing
Future perfect	it will have showed	it will have been showing
		<i>Passive voice</i>
Present	it is observed	it is being observed
Past	it was observed	it was being observed
Future	it will be observed	it will be being observed
Present perfect	it has been observed	it has been being observed
Past perfect	it had been observed	it had been being observed
Future perfect	it will have been observed	it will have been being observed

- A verbal is a special form of a verb, which alone cannot function as a predicate. Predicates are defined shortly. Verbals are classified as:
  - Infinitives (“to observe”)
  - Participles (“observing” in the present and “observed” in the past)
  - Gerunds (“observing”) are serving as nouns

- **Adverb**

- An adverb modifies a verb
- Examples: *frequently, higher, faster*

- **Conjunction**

- A conjunction joins words, phrases, or clauses
- Examples: *and, but, or, nor, for, as, since, so, because*
- **Preposition**
  - A preposition connects a noun, pronoun, or phrase to some other parts of a sentence
  - Examples: *in, on, at, between, by, for, of, to, from, through, with*
- **Interjection**
  - Interjections are stand-alone exclamatory word that expresses emotion and are not used in technical writing
- **Article**
  - An article combines with a noun and determines its definiteness
  - The definite article is *the*
  - The indefinite articles are *a* and *an*

### Sentence Structure

To be grammatically complete, a sentence must have two ingredients:

Subject + Predicate

The subject is usually a noun that names something or someone. The predicate contains a verb and says something about the subject. Within this simple framework the following three sentence structures are most common:

- Subject + Verb
  - Example: *The analysis + is running*
- Subject + Action verb + One or two objects (noun or pronoun)
  - Example: *The results + surprised + the analyst*
- Subject + Linking verb + Complements (noun, pronoun, or adjective)
  - Example: *The figure + shows + the results*
  - Example: *The results + are + surprising*

The last sentence structure above is most common in technical writing. The following additional sentence structures are avoided in written communication, although they conform to the subject+predicate paradigm:

- Subject + Passive verb
  - This structure is called the passive pattern and is used when the object of an active sentence is made the subject
  - Example: *The analyst + performed + the analyses*
- Expletive + Verb + Complement + Subject
  - This structure is used to postpone the subject until after the verb
  - Example: *It + is + unlikely + that they will agree*
  - Example: *There + will be + no change*
- Verb + Object or Complement
  - This structure is used in commands
  - Example: *Analyze this*

## Phrases

A phrase is a group of words that are used as a single part of speech. A phrase does not have a subject and a predicate. Depending on the function of the phrase, it belongs to either of the following categories:

- Prepositional phrases
  - Adjective phrase (*of great importance*)
  - Adverb phrase (*with great care*)
  - Noun phrase (*the analysis of the structure*)
- Verbal phrases
  - Participial phrase: functions as an adjective (*carried out earlier*)
  - Gerund phrase: functions as a noun (*running analyses*)
  - Infinitive phrase: functions as adjective, adverb, or noun (*to carry out the analyses*)
- Conjunctive phrases
  - *for the reason that*
  - *owing to the fact that*
  - *in addition to*
  - *as well as*

## Clauses

A clause is a group of words that contain both a subject and a predicate. There are two kinds of clauses:

- Main (independent) clause
  - Makes an independent statement
- Subordinate (dependent) clause
  - Functions as an adjective, adverb, or noun
  - Is less important than the content of the main clause
  - Often starts with a conjunction, like *because, since, as*

A sentence is classified according to the number of main and subordinate clauses:

- Simple sentence
  - A simple sentence has one main clause.
  - Example: *The results match the observations*
- Compound sentence
  - A compound sentence has two or more main clauses
  - Example: *The analysis converged and the results are accurate*
  - Example: *The analysis was started but it did not converge*
- Complex sentence
  - A complex sentence has one main clause and one or more subordinate clauses
  - Example: *The analysis did not converge because boundary conditions were not defined*
- Compound-complex sentence
  - A compound-complex sentence has two or more main clauses and one or more subordinate clauses

- Example: *The analysis was started but did not converge because boundary conditions were not defined*

### Rules for Technical Writing

1. Write complete sentences
2. Adopt a consistent grammatical “point of view” within each paragraph. The point of view consists of
  - a. The particular subject
  - b. The person (first, second, third) and number (singular, plural) of the pronoun
  - c. The tense (past, present, future), mood (indicative, imperative, subjunctive), and voice (active, passive) of the verb
3. Technical material is written in the third person, indicative, and active form
4. Within the description of a subject the verbs must be consistent, either in the past or present tense
5. Use the present tense to describe material that is generally true or that has no reference to time
6. Make sure that the tense of the verb in a subordinate clause is logically related to the tense of the verb in the main clause.

### Punctuation

- Period .
  - It marks the end of a sentence or signifies an abbreviation
- Comma ,
  - There are no hard-and-fast comma rules, except consistency throughout the paper
  - Commas are utilized to separate parts of sentences to improve readability and avoid confusion
  - It is typical to use comma before “which” but not before “that.” Be careful when interchanging “that” and “which” because the meaning may be different, like in these examples:
    - *The computations that were performed on a Cray were more accurate*
    - *The computations, which were performed on a Cray, were more accurate*
- Semi-colon ;
  - It is used to separate main clauses that are not joined by a conjunction
- Colon :
  - It is used to exemplify, restate, or explain the preceding sentence
- Hyphen -
  - It connects the parts of a compound word
- Dash —

- It sets apart parenthetical material
  - It should be used in moderation
- Quotation marks “ ”
  - They enclose quoted material
  - They are also used to enclose unfamiliar words that the reader would otherwise question; however, it should be applied only at the first instance for the words, not later in the paper
  - They should be used in strong moderation
  - In the North American tradition the closing quotation mark encloses the comma, period, and colon that may appear at the end of the quoted material, like “this.”
- Apostrophe ’
  - It is employed to denote possession, like in Newton’s second law
  - It is also utilized in casual texts to denote contraction, but please don’t use that in technical writing
- Parenthesis ( )
  - They set apart parenthetical material
  - As mentioned earlier, they should be employed in strong moderation
- Brackets [ ]
  - They are used to indicate editorial comments or explanations
- Italics
  - It is applied to words that are not part of the English language, including *et al.*, *e.g.*, *i.e.*, *etc.*
  - It is applied to the title of books and journals
  - Italics, boldface, and underline should not be used to emphasize a word, however tempting, because unless a word is important it should be removed