National Technical University of Athens

Academic writing in engineering: an Introduction

Week 1

Goni Togia

Question time ???

Already???

Suppose you had to start work on your diploma thesis tomorrow:

1. How would you plan your work?
2. What problems do you think you would face?

General info and course book

- 12 weeks.
- You will find all course material on Helios/MyCourses.
- Course book:
  - G. Togia, *English for Chemical Engineering: A Handbook for Advanced Learners of English*, Ropi Publications: Thessaloniki, 2017.

Course assessment

- This course is assessed by final exam only.

Course objectives

- The course focuses on:
  - Analysing the conventions of academic writing.
  - Examining the structure and language of research articles as well as articles in popular science magazines.
  - Introducing students to technical terminology specific to their discipline through authentic texts.

What is academic writing?

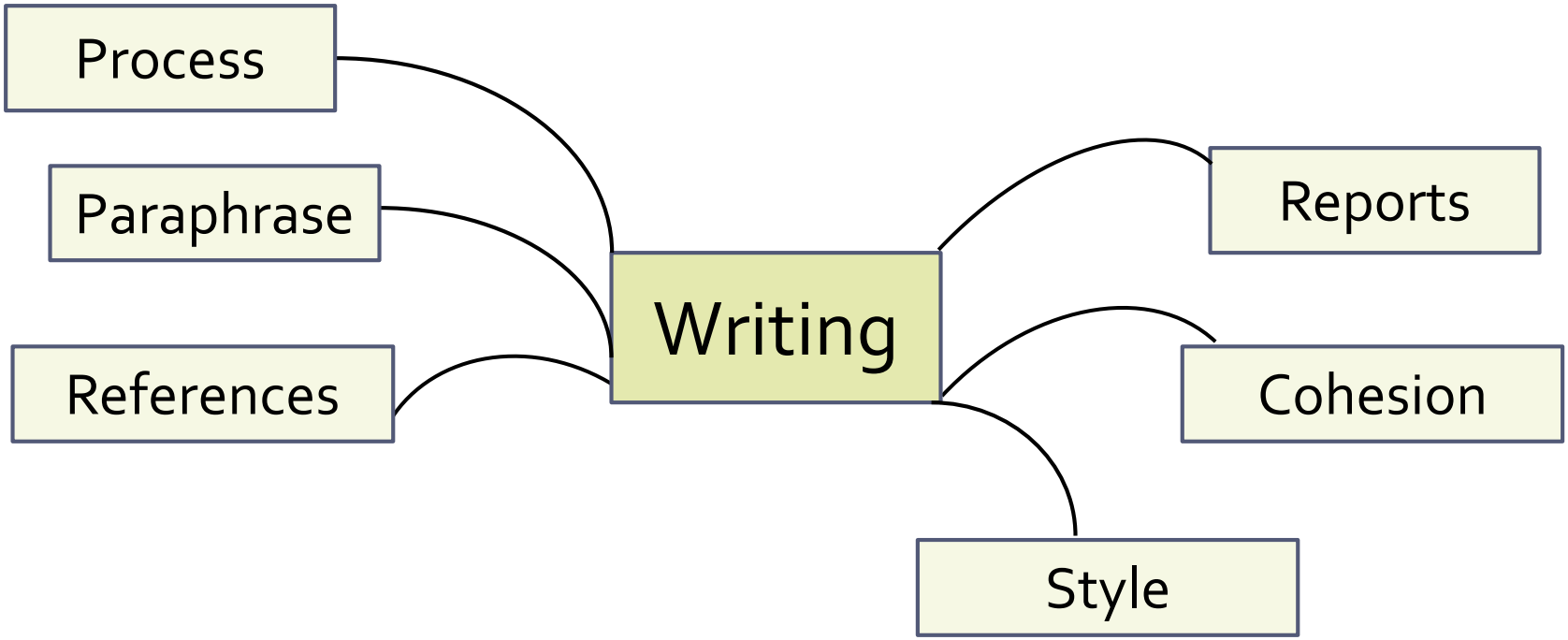
- Academic writing is writing that communicates research to the academic community.

- It can be divided into two types:
  - student academic writing, which is used as a form of assessment at university (or at schools as preparation for university study);
  - expert academic writing, which is writing that is intended for publication in an academic journal or book.
- Both types of academic writing (student and expert) are expected to adhere to the same standards, which can be difficult for students to master.

What is academic writing?

- Academic writing is distinguished from other kinds of writing in that it is:
  - structured;
  - evidenced;
  - critical;
  - precise;
  - objective;
  - formal.

Writing skills



The academic writing process

- **Pre-writing:** finding a writing topic.
- **Researching:** understanding and finding information about your topic.
- **Drafting**: arranging the information you found in the research phase into an outline and writing your first draft.
- **Revising:** incorporate feedback provided by your supervisor or a peer and work towards the final draft of your writing.
- **Proofreading:** fine-tune your writing by checking for mistakes in grammar, spelling and style.

Pre-writing

- To find a writing topic you are going to work closely with your supervisor who is going to guide you through interesting research topics in your field, current research available and relevant bibliography.

Researching

- Once you have decided on your research topic, you are going to do some preliminary search for information to set the context for the research.
- The next steps are: locating your sources (journals and books), evaluating your sources and making notes.

Drafting

- The next stage is to begin your first draft. Before doing so, you should organise your ideas into an outline.
- The outline will include the main structure of your writing and the main ideas as well as how they are organised.

- Then you need to write your first draft by putting the information you found during your research into your own words.

Revising

- During this stage you should focus on incorporating feedback you may have received from your supervisor or a peer as well as finalising the content and organisation of your writing.

- You should start by identifying the major problems you need to work on.
- Remember that this stage of the writing process concerns working on your supporting ideas, references to sources, topic sentences and cohesive devices (for organisation).

Proofreading

- At this stage, your work on structure and content should be complete and you should focus on aspects such as grammar, spelling, and punctuation so as to eliminate as many errors from the final draft as possible.

Levels of language technicality

Types of technical terms

What is technical terminology?

- Words that are specific to a particular domain (of work or study)
- Words that have specialised meanings that require domain knowledge.

- Typically, technical vocabulary items:
  - Lack exact synonyms.
    - What is the synonym of the technical term 'tensor'?
  - Resist semantic change.
  - Have a narrow range of meaning.
    - Compare the senses of a general English word (e.g. 'check') and a technical word (e.g. 'adsorption')

Types of technical terms

- Technical vocabulary occupies a continuum of, let's say, 'technicality'.
  - *Adsorption* is one type of technical term.
  - *Dissociation* and *excite* are different.
  - *Demonstrated* is undeniably different.
- So, where does this leave us?

Types of technical terms: Examples from OED

- *Adsorption:*
  - A specialised meaning in a particular scientific field (chemistry).
    - The process by which a solid holds molecules of a gas or liquid or solute as a thin film.
    - 'the study of the direction of protein adsorption to solid surfaces'

Types of technical terms: examples from OED

- *Dissociation*:
  - A specialised meaning in one field (chemistry).
    - The splitting of a molecule into smaller molecules, atoms, or ions, especially by a reversible process.
    - 'The energy required for a chemical reaction depends on the bond dissociation energy of the atoms comprising the molecules.'
  - A specialised meaning in another field (psychiatry).
    - Separation of normally related mental processes, resulting in one group functioning independently from the rest, leading in extreme cases to disorders such as multiple personality.
    - 'the dissociations that one can observe in neuropsychological patients'.
  - A general English meaning.
    - 'we in the West honour a long-standing dissociation between church and state'.

Types of technical terms: examples from OED

- *Excite*:
  - A technical meaning.
    - Produce a state of increased energy or activity in (a physical or biological system)
    - 'the energy of an electron is sufficient to excite the atom'
    - Physics: thermal excitation
    - Physiology; these neurotransmitters can produce excitation or inhibition'
  - A general English meaning.
    - Give rise to (a feeling or reaction)
    - 'the ability to excite interest in others'

Types of technical terms

- *Demonstrated / Analysed*
  - Used in an academic setting and more likely in the written medium.

Groups of technical terms

- Three main groups emerge from this classification:
  - **Technical terms**: a specialised meaning in a particular field (*adsorption*).
  - **Sub-technical terms**: both a specialised meaning and a general English meaning (*dissociation*, *excite*).
  - **Academic expressions**: (*demonstrated*).

Other examples

Technical terms:	**Sub-technical terms:**
Cathode Streamtube Fullerene Wavefunction	Force Radiation Stress Tension Volume

Technical definitions

- *Enthalpy* is defined in the New Shorter Oxford Dictionary as:
  - "The total heat content of a system, expressed as a thermodynamic quantity obtained by adding its free energy to the product of its pressure and volume."

- Contains three nominal phrases that require further explanation (in red).

Natural gas: a less technical definition

- (Expert's definition): gas for cooking, heating and also used in some vehicles as fuel. Fossil fuel which is in the gas phase. The main component is methane, but it also contains other light hydrocarbons as ethane, propane, and butane, and some contaminants, such as carbon dioxide, and hydrogen sulphide.

Natural gas: a lay definition

- The gas we cook with (in UK), which comes via pipes into our kitchens from the gas mains.

  - *Layperson*: someone who is not trained in or does not have a detailed knowledge of a particular subject (from Cambridge Dictionary)

Technical and sub-technical terms

- While the classification is far from unproblematic, it is useful for one of the main purposes of this course, that is:
  - To familiarise oneself with different levels of technical complexity.
  - Understand in which genre, that is text type, to use them and how.

Context

- Context will determine how specialised your language will be.

- A text for an academic journal:
  - Written in highly technical language.
- The same text written for a popular science magazine:
  - Adapted to the technical proficiency of its readership.

- Understanding the appropriateness of a technical term makes one a better writer and also a better reader.

Short introduction to academic writing

What is academic writing?

- Is the following extract academic or not academic?
- Where would you expect to read it?

  - Many incredible claims have been made about the future's nanotechnological applications, but what exactly does nano mean, and why has controversy plagued this up-and-coming technology?

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A more academic possibility…

- Despite the promising aspects/nature of nanotechnological applications that have been discussed in a number of studies [1-4], the question arising concerns both/on the one hand the exact meaning of the term *nano* and/and on the other the reasons relating to the controversial aspects of nanotechnology.

Academic writing: General

- Academic writing differs from other writing types in the following:

- Function: to demonstrate specialised knowledge in a particular topic.

- Audience: specialised
  - It includes your supervisor, your thesis / dissertation committee or a journal editor or a book publisher.

- Writing style:
  - Specialised language.
  - In-depth analysis of a topic.
  - Coherence of argument structure and validity of evidence are very important.