TECHNICAL COMMUNICATION IN ENGINEERING:

writing and oral presentation

ENGINEERING SCHOOL OF BILBAO

UNIVERSITY OF BASQUE COUNTRY

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STUDY GUIDE

Contents

1. INTRODUCTION AND COURSE DESCRIPTION

Technical communication (written and oral) in engineering is fundamental in both academic and professional settings. In the academic field, the writing of laboratory reports must clearly and concisely reflect the results obtained in the different experimental trials. Technical reports, on the other hand, must describe the work done and the knowledge acquired in a certain area. At the university level, these reports have their culmination in the Final Degree Project or the Master Thesis. These final papers have the particularity of including an oral presentation, or defense, of the same. Despite these requirements, a large number of students lack the necessary skills to effectively communicate the results of their work.

In this context, this course offers the basic theoretical and practical concepts so that every engineering student acquires the ability to write technical reports competently, and present their results appropriately. The experience gained during the academic training stage will be of great value when entering the labor market. In most professional fields, great value is placed on engineering professionals with optimal communication skills.

2. OBJETIVES

The objective of this course is to provide fundamental concepts in order to develop adequate written and oral communication skills in the field of engineering. To this end, the course will provide material on literature search, on technical writing (including case studies), and on oral presentations. The specific objectives of this course are:

1. To acquire the knowledge to carry out a correct search of bibliographical information.
2. To learn about the different methods of writing a technical report.

3. To know the characteristics of each type of report.
4. To plan, structure and design a work exhibition in front of a technical audience.

3. LEARNING OUTCOMES

1. Handle large volumes of information and collect accurate information on an issue or problem.
2. Correctly apply the criteria for introducing graphic elements and bibliographic references in a standardized format.
3. Adapt the technical report writing to the type of audience and objectives set.
4. Correctly present technical work in front of an audience of experts.

4. CONTEXT, TARGETS AND PRE-REQUISITES

This course offers the basic concepts of technical communication in engineering, and is not currently taught in any of the bachelor degrees at the Engineering School of Bilbao.

It is aimed at students of different engineering degrees, since the methods for writing and presenting technical results are presented in general terms, and can be applied to any engineering discipline.

Before taking the course, it is advisable that each student has acquired certain knowledge of the fundamentals of engineering and begins to specialize in their area of study. Hence, we recommend taking this course during the third year of the engineering degrees. The students will be able to apply the knowledge acquired in this course, in subjects that require the writing and presentation of technical results. The following examples as teaching courses are found the Engineering School of Bilbao:

- Engineering Projects, Course 4, Degree in Environmental Engineering and Degree in Industrial Technology Engineering.

- Project Management, Course 4, Degree in Mechanical Engineering.
- Final Degree Projects, applicable to all degrees in Engineering.

Among the prerequisites, it is recommended that each student has passed at least 70% of the credits corresponding to the first two years of the Engineering Degrees.

5. STUDY METHODOLOGY

The proposed methodology aims to encourage the autonomous learning of students so they can develop the skills set out in the course. In each of the topics, the steps to be followed by the students are the following:

1. **Understand the fundamental concepts.** To this end, each student will have the following resources available:
   - Study material. It contains, in a summarized form, the main theoretical concepts of each topic, as well as videos summarizing the most relevant contents.
   - Recommended reading: different external resources will be recommended (manuals, books, scientific articles, informative channels) to complete the study material of each lesson.
   - Illustrative examples: a wide range of technical reports and presentations will be available, allowing the student to highlight positive and negative aspects.
2. To put into practice, both **in technical reports and presentations**, the concepts previously learned:
   - Exercises: A series of activities will be available to apply the concepts studied previously. The correct answers will be shown to enable the self-assessment by each student.
3. **Self-assessment test:** each lesson includes an assessment test, which allows each student to determine their level of achievement in the learning process. The "multiple choice" test will be self-corrected.

6. CONTENTS OF THE PROGRAM

The program of this course is designed so that the students can achieve the established objectives:

1. Introduction and the role of technical communication in engineering

1.1 Introduction

1.2 Communication and its relevance.

1.3 The steps in communication and the quality criteria.

1.4 Communication format.

1.5 Course structure.

1.6 Methodology.

2. Information search and management

2.1 Introduction

2.2 Aims of information search

2.3 Where to find information

2.3.1 Sources of information

2.3.2 Criteria to determine the quality of the information

2.4 Tools to search and manage information

2.4.1 Databases

2.4.2 Bibliographic managers

SELF-ASSESSMENT TEST

EXERCISES

3. Technical writing

3.1 Introduction

3.2 Definition of technical writing

7. CRONOGRAM

Table 1. Proposed schedule for addressing the course.

Week	Lesson	Estimated hours		
		Study[a]	Exercises	Self-assessment
1	1. Introduction and the role of technical communication in engineering 2. Information search and management	3.5	2.0	0.5
2-5	3. Technical writing	7.0	18.0	0.5
6-7	4. Oral presentation	3.0	10.0	0.5
	TOTAL	**13.5**	**30**	**2.0**

[a] Study hours include the reading of recommended material.

8. RECOMMENDED REFERENCES

[1] Pantoja-Vallejo A. ***Manual básico para la realización de tesinas, tesis y trabajos de investigación.*** 2ª ed. Madrid: editorial EOS; 2015.

[2]Orna E y Stevens G. ***Cómo usar la información en trabajos de investigación.*** 1ª ed. Barcelona: Gedisa; 2000.

[3] Latorre A,. del Rincón D., Arnal J. (2003). ***Bases metodológicas de la investigación educativa***. 1ª ed. Barcelona: Ediciones Experiencia; 2003.

[4] García-Sanz MP. y Martínez-Clares P. ***Guía Práctica para la realización de trabajos fin de grado y trabajos fin de master***. 1ª ed. Murcia: Servicio de Publicaciones de la Universidad de Murcia; 2012.

[5] Barrass R. ***Scientist must write.*** 2ª ed. Londres: editorial Taylor and Francis Group; 2005

[6]. Laplante P. A. ***Technical Writing: A practical Guide for Engineers and Scientists.*** Boca Raton. Editorial CRC Press; 2012

[7] Walters D. Eric y. Walters Gale C. *Scientists must speak*. 2ª ed. Boca Raton. Editorial CRC Press; 2011

[8] Álvarez Marañon G. *El arte de presentar*. 10 ª ed. Barcelona: editorial Gestión 2000; 2018.