


San Carlos University of Guatemala  
Engineering School  
Technical Language Department



# Technical English 3 Projects

TECHNICAL  
ENGLISH

**Second Semester 2020**

## General Specifications

The projects have to be done in the groups ALREADY established in class. The date to present this report is October 12<sup>th</sup>/13<sup>th</sup> (The first of these two days in which you have class).

Only the coordinator or one representative of the group will upload the following documents to the UEDI Platform activity associated with this project:

- 1. A text editor document:** This is the digital report in Microsoft Word and a PDF format following the structure and requirements specified in this text.
- 2. A slide presentation:** This is a digital presentation in Microsoft PowerPoint developing the topic that has been chosen from this text.

You will choose **ONLY ONE PROJECT PER GROUP**, which is the one according to the dominant career of the members of your group. For example, in a group of 5 people, if you have three chemical engineering students you have to make the chemical engineering project because of the majority of members from that career. If there is a tie (empate) of the number of members (two dominant careers, for example 2 industrial, 2 chemical and 1 mechanical) choose in consensus one of the two careers that tied.

The following rubric must be included in the **second page** of the work.

Presentation	/ 15
Introduction	/ 15
Objectives (1 general and several specific)	/ 20
Investigation (framework)	/ 20
Conclusions	/ 25
Annexes	/ 5
References (APA Style)	

For this project, the following style and content of **cover page** has to be used:



San Carlos University of Guatemala  
Faculty of Engineering  
School of Sciences

Technical English: \_\_\_\_\_

Section: \_\_\_\_\_

Date: \_\_\_\_\_

**Group Number**

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**Name of the assignment:**

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ID Number	Name

## Civil Engineering

**Topic:** Quality Control

**Project Name:** Construction Quality Control

**Objective:** To obtain a solid idea of how Quality Control is transcendental in all types of physical constructions.

**General Description:** This project consists in researching about the different Quality Control tools, in order to determine through an analysis which of them are the ideal for Civil Engineering construction applications or processes such as: infrastructure, roads, buildings, sewage systems, etc.

### Procedure

The students are going to investigate about the different Quality Controls tools, utilizing for that purpose the gathering of videos, recordings, articles, websites and other sources summarized in a structured report.

The project must include an applied example of the tool which was chosen, ideally with a real life situation.

It is mandatory to include an evidence of every member of the group of students participating actively in the progress of the project.

### Structure of the report

The students will present their work in the following way:

- A written report that will be presented in a CD in Word and PDF formats. The minimum aspects to be covered are:
  1. Cover Page
  2. Index
  3. Introduction
  4. Objectives (one general and at least three specific)
  5. Theoretical and Practical Content (including pictures and quoting if necessary)
  6. Conclusions
  7. Annexes
  8. Bibliography or electronic references

- A video of the group members describing COMPLETELY in English the way Quality Control influences in Civil Engineering and citing a specific example.

## Vocabulary

- |                     |                    |                        |
|---------------------|--------------------|------------------------|
| 1. Assurance        | 11. Instrument     | 21. Precision          |
| 2. Audit            | 12. Interpretation | 22. Quality            |
| 3. Batch            | 13. ISO            | 23. Quality Assessment |
| 4. Calibrate        | 14. Kanban         | 24. Quality Assurance  |
| 5. Competence       | 15. Maintenance    | 25. Sampling           |
| 6. Contractor       | 16. Measurement    |                        |
| 7. Control Chart    | 17. Method         |                        |
| 8. Document Control | 18. Organization   |                        |
| 9. Evaluation       | 19. Peer           |                        |
| 10. Expenditure     | 20. Personnel      |                        |

## Industrial Engineering

**Topic:** Process Diagrams

**Project Name:** The application of process diagrams in industry

**Objective:** To make a description of the manufacturing of a process focused on the actions implied in order to get the final product.

**General Description:** This project consists in researching about the production of one specific product. It is mandatory to include ALL the work stations and procedures implied in the production, from the raw materials area to the final product.

### Procedure

The students have to visit a production plant or a small business where a product of any type is manufactured. The steps of this task are the following:

1. Write a verbal description of the manufacturing process, step by step, including the necessary time for every single action implied in the production (This is a sequential paragraph of the production process).
2. Elaborate the operations diagram of the product's production. The following have to be included: operations, inspections and the combination of those.
3. Elaborate the process flow diagram, including all the components of the operations diagram plus delays, transportations and storages.
4. Elaborate the Process Travel Diagram taking care of placing the different steps of the process flow diagram in the plant's layout (plan view).

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- A video of the group members describing COMPLETELY in English the production process as well as explaining the different diagrams. At least one member has to record the process in the selected plant or small business (a tour of the production process).

## Vocabulary

- |                        |                    |                     |
|------------------------|--------------------|---------------------|
| 1. Header              | 11. Number (verb)  | 21. Standard        |
| 2. Body (of a diagram) | 12. Storage        | 22. Raw materials   |
| 3. Summary             | 13. Delay          | 23. Checking (noun) |
| 4. Operation           | 14. Transportation | 24. Forklift        |
| 5. Inspection          | 15. Transformation | 25. Transfer        |
| 6. Combined operation  | 16. Quality        |                     |
| 7. Efficiency          | 17. Symbol         |                     |
| 8. Productivity        | 18. Assembly       |                     |
| 9. Analyst             | 19. Diagram        |                     |
| 10. Sequence           | 20. Travel         |                     |

## Science and Systems Engineering

**Topic:** Lean Manufacturing

**Project Name:** Creation of value through programming

**Objective:** To propose the foundations of hypothetical software that will ease the attainment of lean manufacturing in a determined industry.

**General Description:** This project consists in choosing one type of industry (footwear, fabric, apparel, etc.) and proposing with the adequate basis the main components of hypothetical software that will facilitate lean manufacturing

### Procedure

The students will concatenate the fundamentals of lean manufacturing with the different programming languages or databases manipulation in order to describe which aspects should be taken in consideration for an eventual program with these characteristics. It is important to notice that this purpose is going to be focused ONLY IN ONE type of industry, previously chosen by the work group and approved by the corresponding teacher.

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- A video of the group members describing COMPLETELY in English the way in which computer programming can be useful in order to achieve lean manufacturing in a specific type of industry.

## Vocabulary

- |  |  |                  |
|--|--|------------------|
| 1. 5s                                  | 11. Manufacturing Resources Planning (MRP) | 21. Sort         |
| 2. Autonomation                        | 12. Motion                                 | 22. Standardize  |
| 3. Bottleneck                          | 13. Muda                                   | 23. Sustain      |
| 4. Constraint                          | 14. Operations                             | 24. Transporting |
| 5. Continuous Improvement              | 15. Over Processing                        | 25. Waste        |
| 6. Delay                               | 16. Overproduction                         |                  |
| 7. Enterprise Resources Planning (ERP) | 17. Process                                |                  |
| 8. Inspection                          | 18. Real Value                             |                  |
| 9. Inventory                           | 19. Set in order                           |                  |
| 10. Making Defective Parts             | 20. Shine                                  |                  |

## Chemical/Environmental Engineering

**Topic:** Bioethanol

**Project Name:** Greenhouse effect reduced by bioethanol usage

**Objective:** To determine and technically describe the chemicals which reduce the greenhouse effect.

**General Description:** This project consists in determining which chemicals and gases are avoided by bioethanol usage, and how this fact becomes a key aspect for human purposes.

### Procedure

The students are going to make a compilation of the different types of gases and chemicals that are suppressed by bioethanol usage and that have a direct influence in the growth of the greenhouse effect, this gathering will be supported by videos or documentaries related to the topic.

The project must include an applied example of an environmental benefit obtained as a consequence of bioethanol usage, specifically mentioning and describing the chemicals or gases implied.

It is mandatory to include an evidence of every member of the group of students participating actively in the progress of the project.

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  6. Conclusions
  7. Annexes

## 8. Bibliography or electronic references

- A video of the group members describing COMPLETELY in English the characteristics of every single chemical or gas that was chosen as a greenhouse effect reductive component.

## Vocabulary

- |                 |                       |                                |
|-----------------|-----------------------|--------------------------------|
| 1. Bioethanol   | 11. Ethylene          | 21. Sawdust                    |
| 2. Biofuel      | 12. Fermentation      | 22. Sorghum                    |
| 3. Biomass      | 13. Fuel              | 23. Sugarcane                  |
| 4. Blend        | 14. Fuel cell         | 24. Volatile organic compounds |
| 5. Crop         | 15. Greenhouse effect | 25. Yeast                      |
| 6. Dehydrate    | 16. Grind             |                                |
| 7. Dilute       | 17. Hydrolysis        |                                |
| 8. Distillation | 18. Lignin            |                                |
| 9. Enzyme       | 19. Methanol          |                                |
| 10. Ethanol     | 20. Octane Rating     |                                |

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## Electrical/Electronic Engineering

**Topic:** Telecommunications

**Project Name:** Bluetooth functionality

**Objective:** To determine the way in which Bluetooth works, and also to make a comparison with traditional telecommunication means.

**General Description:** This project consists in establishing what components are common for both traditional telecommunication means (wire based) and Bluetooth functionality, as well as determining the precise differences between these two subjects.

### Procedure

The students are going to research in detail the way in which Bluetooth communication works, and for this purpose they have to include a diagram of the components that compose a bluetooth system.

For this project, students have to physically present and explain the function of electric or electronic components isolated from a complete device (cell phone, laptop, etc.). It is mandatory to include an evidence of every member of the group of students participating actively in the progress of the project.

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  1. Cover Page
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  6. Conclusions
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- A video of the group members describing COMPLETELY in English the special features of the parts that difference traditional telecommunication means from the Bluetooth devices, ideally showing the physical components while making the exposition.

## Vocabulary

- |                                    |                       |                            |
|------------------------------------|-----------------------|----------------------------|
| 1. Access Point                    | 11. Host              | 21. Profile                |
| 2. Active Mode                     | 12. Inquiry Procedure | 22. Scatternet             |
| 3. Authentication                  | 13. Internet Bridge   | 23. Service security level |
| 4. Bluetooth                       | 14. Master Device     | 24. Slave device           |
| 5. Bluetooth Active Member Address | 15. Name discovery    | 25. Tethering              |
| 6. Bluetooth Connection Protocol   | 16. Paging            |                            |
| 7. Bluetooth device class          | 17. Pairing           |                            |
| 8. Connectable                     | 18. Passkey           |                            |
| 9. Device discovery                | 19. Piconet           |                            |
| 10. Discoverable                   | 20. PIN               |                            |

## Mechanical Engineering

**Topic:** Engines and motors

**Project Name:** Assembly of a basic engine/motor

**Objective:** To acquire the basic sequence knowledge in order to assemble an engine, as well as the notion of how the parts are interconnected in these devices.

**General Description:** This project consists in obtaining basic parts of an engine or motor such as: spark plugs, valves, pistons, etc., and after that assemble a basic motor.

### Procedure

The students are going to assemble a basic engine or at least interconnect the different parts that are implied so that a simulation of the engine's operation is exemplified.

There must be pictures of the group members physically having the parts and a demonstration of the assembly through a video. The best scenario is to make the engine work, if it wasn't possible, the group must at least assemble the engine with ALL THE NECESSARY PARTS (no exceptions with these regulation).

### Structure of the report

The students will present their work in the following way:

- A written report that will be presented in a CD in Word and PDF formats. The minimum aspects to be covered are:
  1. Cover Page
  2. Index
  3. Introduction
  4. Objectives (one general and at least three specific)
  5. Theoretical and Practical Content (including pictures and quoting if necessary)
  6. Conclusions
  7. Annexes
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- A video of the group members describing COMPLETELY in English the engine's operation with the premise of physically having the parts that compose the motor.

## Vocabulary

- |                         |                   |                  |
|-------------------------|-------------------|------------------|
| 1. AC induction motor   | 11. Sump          | 21. Rated torque |
| 2. AC synchronous motor | 12. Rotor         | 22. Resonance    |
| 3. Amplifier            | 13. Commutator    | 23. Stator       |
| 4. DC motor             | 14. Brush         | 24. Stiffness    |
| 5. Spark plug           | 15. Axle          | 25. Winding      |
| 6. Valve                | 16. Field magnet  |                  |
| 7. Piston               | 17. Horsepower    |                  |
| 8. Piston rings         | 18. Inductance    |                  |
| 9. Connecting rod       | 19. Outgassing    |                  |
| 10. Crankshaft          | 20. Rated current |                  |

## Math and Physics Bachelor Degrees

**Topic:** Solar Energy

**Project Name:** Modeling the transmission of Solar Energy

**Objective:** To build the technical foundations of the transmission of solar energy to our planet.

**General Description:** This project consists in determining math models that forecast physical properties of solar energy motion to earth as well as describing properties and components of this type of energy based on physics theory.

### Procedure

The students are going to research about math modeling related to solar energy traveling to Earth. They must justify with a theoretical example (equations or functions) the motion of solar energy.

Moreover, there must be included a profound explanation of the physical concepts that are implied in the movement of solar energy to Earth. A basic laboratory demonstration of the concepts must be included with the explanation of all the group members; it can be something which shows a basic notion of the behavior of this type of energy.

### Structure of the report

The students will present their work in the following way:

- A written report that will be presented in a CD in Word and PDF formats. The minimum aspects to be covered are:
  1. Cover Page
  2. Index
  3. Introduction
  4. Objectives (one general and at least three specific)
  5. Theoretical and Practical Content (including pictures and quoting if necessary)
  6. Conclusions
  7. Annexes
  8. Bibliography or electronic references



- A video of the group members describing COMPLETELY in English the mathematical models and the physical concepts that describe the movement and transferring of solar energy to Earth.

## Vocabulary

- |                         |                        |                     |
|-------------------------|------------------------|---------------------|
| 1. Cell (solar energy)  | 11. Battery            | 21. Volt            |
| 2. Inverter             | 12. Converter          | 22. Watt            |
| 3. Insolation           | 13. Concentrator       | 23. Array           |
| 4. Micron               | 14. Direct Current     | 24. Electrical Grid |
| 5. Module               | 15. Irradiance         | 25. Wave (motion)   |
| 6. Photovoltaic cells   | 16. Photovoltaic Array |                     |
| 7. Polycrystalline      | 17. Solar panel        |                     |
| 8. Silicon              | 18. Solar resource     |                     |
| 9. Wafer                | 19. String             |                     |
| 10. Alternating Current | 20. Tracking equipment |                     |