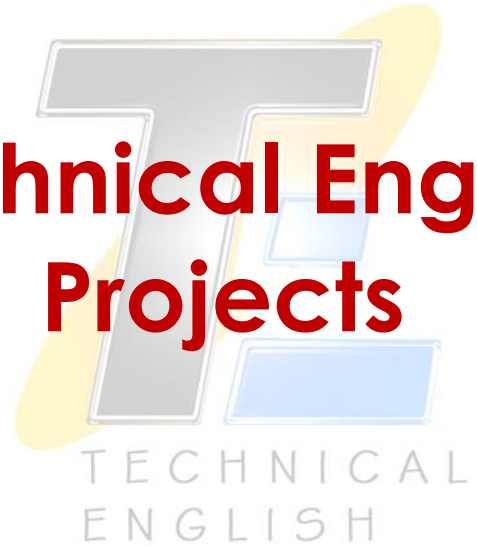
San Carlos University of Guatemala
Engineering School
Technical Language Department

Technical English 3 Projects



First Semester 2020

General Specifications

The projects will be done **individually** or in **pairs** at most.

The date to submit the report in digital version (Word and PDF) and oral presentation (a YouTube link with a video) is February 2nd until midnight (one day before the exam). The digital report and YouTube link will be sent to the following mail:

ingles@ing.usac.edu.gt

In the subject of the message of the mail students must include the following phrase: "Proficiency project, Technical English #", instead of the last symbol, place the number of course you are taking the exam about. In the body of the message place the names and ID's of all the member or members included in the project.

On the other hand, the written version of the report will be turned in during the exam (February 3rd) in a **letter size green folder** with fastener and a cover page identifying at least: name or names of the members, ID numbers (of the university), date, affiliation and the phrase "Proficiency project, Technical English #".

The following rubric must be included on the cover page:

Presentation	/ 15
Introduction	/ 15
Objectives	/ 15
State-of-the-art (Theory)	/ 10
Conclusions	/ 15
Annexes	/ 5
References	
Oral Presentation	/ 25

You will choose ONLY ONE PROJECT according to your career (or the closest one) or your partner's career (in case you did it in pairs).

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

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

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

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

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).

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

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.

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