

PROJECTX N° 020

“ELECTRICAL POWER QUALITY ANALYSIS”

PRESENTATION



Lycée Polyvalent
Isaac NEWTON

Promoting school:

Lycée Polyvalent Isaac Newton
Clichy. France



A. GENERAL DESCRIPTION

Title of the ProjectX

ELECTRICAL POWER QUALITY ANALYSIS

Core area

GENERAL / KNOWLEDGE

ELECTRICITY

PARTICULAR / ACTIVITY:
EQUIPMENT

QUALITY TOOL FOR THREE PHASE POWER / INDUSTRIAL

Promoting school

LYCEE ISAAC NEWTON

Schools participants in the revision of the ProjectX

SAVO
LYCEE ISAAC NEWTON
SCCB
XABEC

Reference to ECVET Credit System and EQF / NQF

ECVET	EQF	REFERENCE TO NATIONAL QUALIFICATIONS (NQF)						
		Spain	Finland	Romania	Portugal	UK	Turkey	France
2	4	4	4	3	4	3	4	4

Learning Outcomes achieved (to be developed in the future related with ECVET credit system)

1. Compare an electrical installation to the IEC international standards
2. Assess the electric safety and availability of an electrical installation
3. Generate an electrical audit of a 3 phase power supply

Time that is necessary to do the ProjectX (in hours)

Theory: 20 hours
Practice: 15 hours

Link to real companies in your region (it is just informative)

- | | |
|------------------------------------|--|
| 1. NAME: SHELL LUBRICANT. | WORKPLACE: FILLING MACHINE |
| 2. NAME: GEODIS CALBERSON SERVICES | WORKPLACE: PROVIDER OF PARCEL AND EXPRESS PARCEL |



B. THEORY

Objectives of the theoretical Knowledge

1. To study the Load
2. To verify electrical system capacity
3. To confirm the current carrying capacity of a cable, methods of installation
4. To check the protection of goods/Protection of electrical equipment (fuse – circuit breaker)
5. To check the protection of person / Ground fault protection / Residual current devices
6. To verify the coordination between protections
7. Evaluate the power factor (the need of correction)
8. To study Variable-frequency drive effects / harmonics

List of activities

1. Define, according to the installation standards, basic principles for the protection of persons against the risk of electrical shocks
2. for the user or the operator, check that the electrical power supply is:
 - Risk free (safety of persons and goods)
 - Always available (continuity of supply)

C. PRACTICE

Brief description of the Practice

1. Make an Energy assessment
2. The objective is to quantify energy consumption for each machine in the school laboratories
3. The objective is to check Quality of service compliance – validate incoming power quality at the service entrance
4. Valid the protection devices (circuit breaker / fuse / RCD ...)

Steps or activities to be performed by the student

- | | |
|---------|--|
| First: | Choose a safety measurement protocol |
| Second: | Perform the quantity and quality electrical energy audit (A, V, cos phi, harmonics, kWh ...) |
| Third: | Propose improvements if necessary to the teacher |



D. DETAILED DESCRIPTION OF LEARNING OUTCOMES.

Learning Outcome:	Compare an electrical installation to the IEC international standards
Knowledge	
<ul style="list-style-type: none"> - He/she knows what is an electrical blueprint and wiring diagram - He/she knows the protection principles for electrical safety (electric shock, protection against thermal effects, protection against overcurrent...) - He/she knows how to Select and erect electrical equipment (common rules , wiring system, earthing arrangements , protective conductors) 	
Skills	
<ul style="list-style-type: none"> - He/she able to find the electrical box of a workplace, of a machine - He/she must be able to know the voltage and type of the power supply - He/she must be able to recognize the ground system - He/she must be able to read the main characteristics of the circuits 	
Competences	

Learning Outcome:	Assess the electric safety and availability of an electrical installation
Knowledge	
<ul style="list-style-type: none"> - He / she knows the necessary occupational safety especially for electrical measurements - He / she knows the various measuring instruments and their intended purpose - He / she can explain the different measurement protocol - He / she can explain the measurement process of the different instruments and their proper storage - He / she knows the verification of measuring instruments 	
Skills	
<ul style="list-style-type: none"> - He/she checks the measuring instruments on their function and accuracy - He/she can check the Earth & Ground Resistance and continuity - He/she can check residual current protection devices - He/she draws up a results chart 	
Competences	
<ul style="list-style-type: none"> - He /she must be able to select the right instruments - He/she must be able to validate the size of protection devices - He/she must be able to validate the efficiency and correct working order. 	



Learning Outcome:	Generate an electrical audit of a 3 phase power supply
Knowledge	
<ul style="list-style-type: none"> - He / she knows the necessary occupational safety especially for electrical measurements - He / she knows the various measuring instruments and their intended purpose - He / she can explain the different measurement protocol - He / she can explain the measurement process of the different instruments and their proper storage - He / she knows the verification of measuring instruments - He/she knows the influence of power factor , harmonics onto energy efficiency 	
Skills	
<ul style="list-style-type: none"> - He / she checks the measuring instruments on their function and accuracy - He / she prepares the clamps for measuring with the power analyser - He/she can set up the measurement tools - He / she draws up a results chart 	
Competences	
<ul style="list-style-type: none"> - He / She must be able to select the right instruments - He/she must be able to setup a tool for the correct objectives - He/she must be able to validate the efficiency of the electricity network or initiate appropriate activities to improve the network 	

