

## PROJECTX N° 007

# “CHECKING THE PERFORMANCE AND LOAD CHARACTERISTICS OF AN INDUCTION MACHINE”

## PRESENTATION



**Promoting school:**

University of Pitesti  
Pitesti. Romania



## A. GENERAL DESCRIPTION

### Title of the ProjectX

**CHECKING THE PERFORMANCE AND LOAD CHARACTERISTICS OF AN  
INDUCTION MACHINE**

### Core area

GENERAL / KNOWLEDGE	<b>ELECTRICITY</b>
PARTICULAR / ACTIVITY:	<b>DESIGN, MEASUREMENT, ENGINEERING</b>

### Promoting school

UNIVERSITY OF PITESTI

### Schools participants in the revision of the ProjectX

LYSEE ISAAC NEWTON  
XABEC  
VAL DO RIO  
MERAM VOCATIONAL SCHOOL

### Reference to ECVET Credit System and EQF / NQF

ECVET	EQF	REFERENCE TO NATIONAL QUALIFICATIONS (NQF)						
		Spain	Finland	Romania	Portugal	UK	Turkey	France
1	3	3	3	3	3	3	3	3

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

1. ELYEG02 (TopMost) Recognizing the characteristics of AC machines, carrying out tests and describing the formation and performance
2. ELYAS07 (TopMost) Perform installation and maintenance of AC/DC machines, alternors and single/three phase transformers
3. ELYMS01 (TopMost) Measure and assess (or interpret) electrical quantities (or values) of components in electrical circuits and systems

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

Theory:	10 hours
Practice:	10 hours

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

- |                        |                            |
|------------------------|----------------------------|
| 1. NAME: CEZ ROMANIA   | WORKPLACE: PITESTI         |
| 2. NAME: HYDROCENTRALE | WORKPLACE: CURTEA DE ARGES |



## B. THEORY

### Objectives of the theoretical Knowledge

1. Describe the mains part of the induction machines
2. Implement the electrical diagrams
3. Connect ampere, voltmeter and power meter in electrical diagrams
4. Define load characteristic of AC motor

### List of activities

1. To measurement of the stator winding resistance, current of the motor read the chapter 10 of Electrical measuring instruments and measurements (<http://ebookbrowse.net/measurements-pdf-d180133941>)
2. Connect of AC motor to power supply CHAPTER 7 – INDUCTION MOTOR of Electric Machinery Fundamental by Stephen Chapman
3. To measurement current of the motor, active power, power factor read the chapter 10 of Electrical measuring instruments and measurements (<http://ebookbrowse.net/measurements-pdf-d180133941>)
3. Explain the shape of load characteristic of induction motor read CHAPTER 4 – AC Machinery of Electric Machinery Fundamental by Stephen Chapman

## C. PRACTICE

### Brief description of the Practice

1. Recognize a three-phase asynchronous motor from the rating label and terminal board
2. Connect an induction motor with slip-ring rotor and operate the motor for the purpose of recording the load characteristics
3. Calculate the delivered power, the power factor, the apparent power, efficiency and slip
4. Draw the load characteristic curves from the values obtain by measurements and calculations.
5. Indicate the value of nominal torque on the characteristic curves
6. Comment on the shape of the characteristic curves

### Steps or activities to be performed by the student

- |         |                                                                                                                                                                                                            |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| First:  | Copy the details from the motor rating label and the terminal board annotation.                                                                                                                            |
| Second: | Measure the stator winding resistance                                                                                                                                                                      |
| Third:  | Assemble the circuit, as shown in the diagram                                                                                                                                                              |
| Fourth: | Before operating the motor completing the setting of ammeter, voltmeter                                                                                                                                    |
| Fifth:  | Operate the motor. Set the torque on the control unit, to the value given. At each torque setting, measure the current of motor, the speed n, the power factor, the voltage, the consumed electrical power |
| Sixth:  | Enter the measured values in table                                                                                                                                                                         |



#### D. DETAILED DESCRIPTION OF LEARNING OUTCOMES.

<b>Learning Outcome:</b>	<b>ELYEG02 (TopMost)</b> <b>Recognizing the characteristics of AC machines, carrying out tests and describing the formation and performance</b>
<b>Knowledge</b>	
<ul style="list-style-type: none"> <li>- Demonstrates Knowledge of the fundamentals of three phase asynchronous motor</li> <li>- To identify the appropriate terminals of involved components in wiring diagram</li> </ul>	
<b>Skills</b>	
<ul style="list-style-type: none"> <li>- Recognise the three phase asynchronous motor related to terminal box and rating label</li> </ul>	
<b>Competences</b>	
<ul style="list-style-type: none"> <li>- Cognitive competence: to identify the appropriate terminals of the electric machines</li> <li>- Personal competence: to be able to communicate with team members when analysing an asynchronous motor</li> <li>- Ethical competence: be able to work in team</li> </ul>	

<b>Learning Outcome:</b>	<b>ELYAS07(TopMost)</b> <b>Perform installation and maintenance of AC/DC machines, alternors and single/three phase transformers</b>
<b>Knowledge</b>	
<ul style="list-style-type: none"> <li>- To identify the appropriate terminals of involved components in the wiring diagram</li> </ul>	
<b>Skills</b>	
<ul style="list-style-type: none"> <li>- Perform connections in the wiring diagram</li> <li>- Use the appropriate tools to detect a defect in a schematic: voltmeter, ohmmeter, wattmeter and ammeter</li> </ul>	
<b>Competences</b>	
<ul style="list-style-type: none"> <li>- Cognitive competence: to be able to read an electric schematic</li> <li>- Functional competence: be able to wire different apparatus in the schematic. To be able to connect in an electric circuit basic measurement apparatus: V, <math>\Omega</math>, A,W</li> <li>- Personal competence: to be able to communicate with team members</li> <li>- Ethical competence: to be able to work in team</li> </ul>	



<b>Learning Outcome:</b>	<b>ELYMS01 (TopMost)</b> <b>Measure and assess (or interpret) electrical quantities (or values) of components in electrical circuits and systems</b> <b>Calculate the delivered power, the power factor, the apparent power, efficiency and slip</b> <b>Draw the load characteristic curves from the values obtain by measurements and calculations</b>
<b>Knowledge</b>	
- Applies the correct statistical methods to analyse and investigate data	
<b>Skills</b>	
- Uses electrical engineering tools, such as computer-assisted engineering and design software and equipment, to carry out responsibilities	
<b>Competences</b>	
- Cognitive competence: <ul style="list-style-type: none"> <li>▪ be able to calculate the delivered power, the power factor, the apparent power, efficiency and slip</li> <li>▪ to be able to draw the load characteristic curves from the values obtain by measurements and calculations</li> </ul> - Functional competence: be able to use engineering tools based on statistical methods. <ul style="list-style-type: none"> <li>- Personal competence: to be able to communicate with team members</li> <li>- Ethical competence: to be able to work in team</li> </ul>	

<b>Learning Outcome:</b>	<b>ELYMS01 (TopMost)</b> <b>Measure and assess (or interpret) electrical quantities (or values) of components in electrical circuits and systems</b> <b>Indicate the value of nominal torque on the characteristic curves</b>
<b>Knowledge</b>	
- Maintains a comprehensive Knowledge of the engineering fundamentals such electrical machines	
- Demonstrates an understanding of electrical machines	
- Comprehends how three phase asynchronous motor specifics integrate into a larger project	
<b>Skills</b>	
- Perform to analyse the characteristic curves and indicate the nominal torque value	
- Perform to analyse the characteristic curves and indicate the nominal torque value	
<b>Competences</b>	
- Cognitive competence: to be able to read the load characteristic curves from the values obtain by measurements and calculations	
- Personal competence: to be able to communicate with team members	
- Ethical competence: to be able to work in team	

