PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/2022

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

Gentlemen:

Please furnish this office the following articles subject to the terms and conditions contained herein:

Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
1	lot	**FLEXIBLE LEARNING AS THE NEW NORMAL EMERGING TECHNOLOGY FOR AN IMPROVE AND INNOVATIVE EDUCATION** Consists of: Multi-technology Interactive e-Learning solution for engineering, technology and STEM with the use of different teaching tools such as text, 3D animation, video, audio and virtual simulation 1 year subscription and Unlimited Users • Industry-based interactive learning curriculum - The curriculum is always being updated with a weekly or monthly frequency whenever there are new trends in technology in the industry, therefore produced manpower graduating from the e-Learning system will always have up-to-date industry skills. • Virtual hardware simulators - Practice real-life technical skills in a virtual environment where the same instructions on a virtual environment can be directly applied on real hardware. • Multiple teaching aids on every module – Modules use videos, animations, texts, charts, 3D models, narration, real-world examples, etc., to make the learner better understand the lesson as much as possible no matter the level of retention and strength of understanding. • Custom course creation - You can create a custom set of modules from the main curriculum library and create a custom training system, for a given student or class, or even for a specific occupation. • Seamless enrollment – Using a unique code that is assigned to the subscription license, all you have to do is send the code to email addresses of your applicants and they can enroll themselves into the e-Learning system. • Management – Monitor every individual's learning progress	1	4,705,000.00	**4,705,000.00**

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme:

HYTEC POWER, INC. /AUG 03 2022
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 12-305 003-2022-07-04(1)
Amount : ₱ 9705 000-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

Gentlemen:

Please furnish this office the following articles subject to the terms and conditions contained herein:

Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		enrolled in the e-Learning system, and see all of the modules they have taken, when they have started a module, when they have last opened a module, and how many quizzes they have completed. You can also generate a tabulated report of the learning progress of each individual or of an entire class, be it in a spreadsheet format or PDF. • SCORM Package Builder – You can make SCORM packages from the modules of the curriculum and integrate it into learning management systems like Electude, Moodle, Blackboard, Canvas, etc. Interactive Multimedia Promotes Learning Engagement Using the beast instructional design practices, Distance eLearning utilizes a wide range of interactivity to suit anyone's learning style. • Solve Technical Calculations • Classify Items for Applications • Identify Components • Knowledge Checks • Identify Sequence of Operation • Self-Reviews Applicable Programs/Courses • Mechanical Engineering • Electronics Engineering • Electrical Engineering • Computer Engineering • Industrial Engineering • Civil Engineering • Chemical Engineering • Mechatronics Engineering • Marine Engineering • Manufacturing Engineering			

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Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. ERIC JOE S. SCHMIDT /AUG 0 3 2022

HYTEC POWER, INC.
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT: TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-308604-2022-03-0161
Amount : ₱470,000-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

Gentlemen:

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Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		• Aeronautical Engineering • Agricultural Engineering • ALL Industrial Technology Courses • Medical Courses • K12 STEM & TVL • TVET Courses **eLearning Categories** **I. AUTOMATION** 1. Ethernet for Mechatronics 2. Mechatronics HMI 3. Mechatronics (AB CompactLogix L32) 4. Mechatronics Profibus 5. Mechatronics Troubleshooting (AB CompactLogix L32) 6. Mechatronics Troubleshooting-AB L32 7. Mechatronics - AB CompactLogix/rsLogix 5000 (Siemens 300 Series) 8. Mechatronics - CompactLogix Ethernet/IP 9. Panelview Operator Interface - AB Controllogix 10. Mechatronics Simulation (mechasim) 11. Mechatronics Simulation (Siemens S7-300 Series) 12. Pegasus Robotics Simulation 13. Robotics and Computer Programming (AB CompactLogix L16) 14. Robotics 1 15. Mechatronics CNC Mill 16. Machine Vision Inspection Systems 17. Machine Vision Inspection Systems (AB micro800) 18. Mechatronics Troubleshooting System AB CompactLogix L16 - AB Micro820			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: /AUG 0 3 2022
HYTEC POWER, INC.
(Signature over printed name & date)
Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT - TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-308103-2022-07-0161
Amount : ₱ 4705 000-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

Gentlemen:

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Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		19. Mechatronics RF Identification System (AB CompactLogix L16) Execution System - A 20. Mechatronics AB Micrologix 21. Mechatronics Barcode Identification 22. Mechatronics RF Identification System 23. Mechatronics RF Identification System 24. Tabletop Mechatronics 25. Mechatronics HMI Siemens S7-1500 26. Mechatronics Barcode Identification 27. Mechatronics Barcode Identification 28. Table-Top Mechatronics Servo Robot System 29. Table Top Smart Factory RFID/Sensors 30. Mechatronics Barcode Product Identification 31. Tabletop Smart Factory Ethernet 32. Tabletop Smart Factory Manufacturing 33. Smart Factory Barcode SystemSiemens S7-1500 34. Mechatronics RFID S7-1500 35. Smart Factory Vision Inspection System Siemens S7-1500 36. Smart Factory Visual Communication System Siemens S7-1500 37. Mechatronics System (Siemens S7-1500) 38. Mechatronics - Siemens S7-1500/Siemens STEP 7 Professional 39. Smart Factory Sensor System Siemens S7-1500, Pneumatics/Vacuum 40. Smart Factory Sensor System Siemens S7-1500, Ultrasonic 41. Smart Factory Sensor System Siemens S7-1500, Photoeye 42. Smart Factory Device Learning System Siemens S7-1500, Stack Light 43. Smart Factory Sensor System Siemens S7-1500, Electrical			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: AUG 03 2022

HYTEC POWER, INC.
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT- TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-301103-2022-07-0161
Amount : P 4905000-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

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Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		Current 44. Smart Factory Sensor System Siemens S7-1500, Analog Position 45. Smart Factory Sensor System Siemens S7-1500, Analog Pressure 46. Tabletop Smart Factory Visual Communications Allen-Bradley 47. Smart Factory Barcode System Allen-Bradley L16 48. Mechatronics RFID AB L16 49. Smart Factory Ethernet AB CompactLogix L16 50. Smart Factory Network Security Learning System – AB CompactLogix L16 51. Smart Factory Manufacturing Execution System - AB CompactLogix L16 52. Smart Factory Visual Communications Allen-Bradley 53. Smart Factory Sensor System Allen-Bradley L16, Pneumatics/ Vacuum 54. Smart Factory Sensor System Allen-Bradley L16, Ultrasonic 55. Smart Factory Sensor System Allen-Bradley L16, Photoeye 56. Smart Factory Device Learning System Allen-Bradley L16, Stack Light 57. Smart Factory Sensor System Allen-Bradley L16, Electrical Current 58. Smart Factory Sensor System Allen-Bradley L16, Analog Position 59. Smart Factory Sensor System Allen-Bradley L16, Analog Pressure 60. Mechatronics AB CompactLogix L32 61. Computer Control 2 (Micro820) 62. Principles of Robotics 63. Principles of Factory Automation 64. Principles of Robotics			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. ERWIN JOE S. SOLIMAN /AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)
Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 12-008603-2022-07-0161
Amount : ₱ 9705000~

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
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Gentlemen:

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Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		II. ELECTRONICS 1. DC Electronic Drives 2. Portable Plc - Siemens S71200 3. Portable Plc Troubleshooting Siemens S71200 4. PLC Analog Application - ControlLogix 5. PLC ControlNet - ControlLogix 6. Mastering Programmable Controllers 7. PLC Statement List 8. PLC Analog - Siemens S7300 10. PLC Profibus - Siemens S7 11. MPC (siemens Mp277) 12. PLC Graph Programming - S7300 13. MPC - Siemens S7-300/as-i Bus 14. MPC (SIEMENS ET200pro/STEP 7) 15. Mastering Programmable Controllers 16. PLC Troubleshooting Siemens S7-300 Series 17. Programmable Controller, Siemens S7312 18. Mastering Programmable Controllers (A-B CompactLogix L16) 19. Power and Control Electronics 20. AC Motor Drives 21. AC Motor Drive Troubleshooting 22. Electrical Control Systems 23. Variable Frequency AC Drive 24. AC Electronic Drives 25. PLC Motor Control AB Micro820 26. PLC Motor Control AB Micro 810 27. Portable PLC Learning System Allen Bradley CompactLogix L16 28. Portable PLC with Troubleshooting Allen Bradley CompactLogix			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme:

AUG 03 2022

HYTEC POWER, INC.
(Signature over printed name & date)
Bank Account Name:
Bank Account Numbe
Bank Name:
Bank Address:

COMMISSION ON AUDIT TSU
RECEIVED
By: Date AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-2021 08-022-07-0161
Amount : ₱ 4705,000-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
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Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		29. PLC Troubleshooting -AB ControlLogix 30. PLC Troubleshooting -AB SLC500 31. Computer Control 1 (A-B Micro820) **III. ELECTRICAL** 1. Electric Motor Control 2. AC/DC Electrical Systems 3. Electrical Control 1 4. Portable Electric Relay Control Troubleshooting 5. Electric Relay Control 6. AC/DC Electrical Systems 7. Electric Motor Control 8. Electric Motor Control Troubleshooting 9. Electrical Fabrication 1 10. Motor Braking 11. Reduced Voltage Starting 12. Electronic Sensors 13. Electronic Counter 14. SCR Speed Control 15. Electric Wiring System 16. PLC/VFD Wiring System 17. Industrial Soldering 18. Ethernet and Analog Wiring 19. Electrical Power Distribution 20. Electric Motor Control 21. Motor Troubleshooting System 22. Rotating Electric Machines 23. DC Generators 24. Wound Rotor Motor			

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Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. [illegible] S. SCHMIDT AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT - TSU
RECEIVED
By: [illegible] Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-398603-2022-07-0161
Amount : P41,705,000

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		25. Rotating Electrical Machines **IV. FLUID POWER** 1. Hydraulic Troubleshooting 2. Pneumatic Troubleshooting 3. Basic Pneumatics 4. Basic Hydraulics 5. Portable Pneumatics 6. Electronic Sensors 7. Basic Hydraulics Troubleshooting 8. Basic Pneumatics Troubleshooting 9. Portable Basic Hydraulics 10. Hydraulic Maintenance 11. Intermediate Hydraulics 12. Intermediate Pneumatics 13. Electronic Sensors 14. Advanced Pneumatics 15. Advanced Hydraulics 16. Electro-Fluid Power Systems17. Pneumatic Fitting Construction 18. Principles of Hydraulics **V. GREEN ENERGY** 1. Wind Concepts 2. Turbine Electric Hub Troubleshooting 3. Turbine Generator Control Troubleshooting 4. Turbine Nacelle Troubleshooting 5. Solar Concepts 6. Solar Site Analysis 7. Alternative Energy 8. Solar Thermal Troubleshooting Open-Loop			

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Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. ERIC JOHN S. SOLIMAN /AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)
Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT - TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-308603-2022-07-0161
Amount : ₱ 41705.000

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
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Date: 7/7/2022
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Date of Delivery:

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Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		9. Solar Thermal Troubleshooting Closed-Loop 10. Solar Thermal Installation 11. Solar PV Troubleshooting 12. Solar Grid-Tie 13. Data Acquisition 14. Solar Photovoltaic Installation **VI. LEAN MANUFACTURING** 1. Lean Overview and Workplace Organization 2. Introduction to Lean 3. 5S 4. Total Productive Maintenance 5. Poka-Yoke 6. Lean Theory 7. Lean Process Flow 8. Visual Workplace 9. Standardized Work 10. Kaizen 11. Value Stream Mapping 12. Set-Up Reduction 13. Six Sigma **VII. MACHINING** 1. Machine Tools 117. Pneumatic Fitting Construction 2. Machine Tools 2 3. Machine Tools 3 4. Manual Machine Tools 5. CNC Machine Tools 1 6. CNC Machine Tools 2 7. CNC Machine Tools 3 (Denford Microturn)			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. ERNESTO S. SOLIMAN AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT TSU
RECEIVED
By: _____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-308403-2022-07-0161
Amount : P 41,705.1000

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		8. Principles of CNC 9. CNC Control 10. Principles of Turning 11. Principles of Machining Centers 12. Principles of Grinding 13. Principles of Workholding 14. Principles of Coolants and Oils 15. Principles of Gear Manufacturing 16. Principles of Tooling 17. Tooling for Turning 18. Tooling for Machining Centers 19. Tooling for Grinding 20. Tooling for Tapping **VIII. MANUFACTURING PROCESS** 1. Product Finishing 2. Production Assembly 3. Split Flange Coupling Assembly 4. Electric Torque Wrench Assembly 5. Print Reading 1 6. Welding Technology 1 7. Computer-Aided Design 1 SolidWorks 2019 8. Computer Aided Design 2 SolidWorks 2019 9. Wiring Harness Assembly 10. Contamination 11. Fasteners 12. Gaskets 13. Stall Bar Assembly 14. Instrumented DC-Electric Torque Wrench Assembly			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. ERIC JOVES SOLIMAN / AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)
Bank Account Name:
Bank Account Numbe
Bank Name:
Bank Address:

COMMISSION ON AUDIT - TSU
RECEIVED
By: ____ Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-008 103-2022-07-01641
Amount : ₱ 4703 000 -

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
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TIN No. : 229-283-188-000
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Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		15. Computer-Aided Manufacturing 1 (Mastercam X2) 16. Blueprint Reading 17. AWS Welding Symbols on Blueprints 18. General Dimensioning and Tolerances 19. Geometric Dimensioning and Tolerancing **IX. MATERIALS** 1. Plastic Mold Design 2. Manufacturing Processes 3 3. Structural Engineering 1 4. Structural Engineering 2 5. Surveying 6. Materials Engineering 1 7. Principles of Materials - Ferrous Metals 8. Principles of Materials - Non-Ferrous Metals 9. Principles of Heat Treating 10. Principles of Plastics 11. Principles of Composites 12. Principles of Ceramics **X. MECHANICAL** 1. Vibration Analysis 2. Pump Systems 3. Multiple Pump 4. Turbine Pump 5. Diaphragm Pump 6. Peristaltic Tubing Pump 7. Piston Pump 8. Gear Pump 9. Magnetic Pump			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme: ENGR. ERIC [illegible] /AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT TSU
RECEIVED
BY: Date: AUG 05 2022

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-305003-2022-07-0161
Amount : ₱ 4705,000

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

Gentlemen:

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Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		10. Centrifugal Pump 11. Rigging 3 12. Mechanical Drives 4 13. Floor Standing Belt Conveyor 14. Predictive Maintenance Vibration Analysis 15. Roller Pack Machine Tool Axis 16. Plain Bearing Machine Tool Axis 17. Mechatronics Simulation 18. Pipings 19. Central Lubrication 20. Mechanical Systems 1 21. Mechanical Fabrication 2 22. Rigging Systems 1 23. Rigging Systems 2 24. Mechanical Fabrication 1 25. Mechanical Drives 1 26. Portable Mechanical Drives 2 27. Mechanical Drives 2 28. Mechanical Drives 3 29. Laser Shaft Alignment 30. Portable Laser Shaft Alignment 31. Mechanical Systems 2 **XI. PROCESS CONTROL** 1. Temperature Process Control 2. Data Acquisition 3. Analytical Process Control 4. Data Acquisition Systems 5. ControlLogix Process Control			

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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		6. Process Control Systems: Ultrasonic Level Measurement and Control 7. Process Control Systems: Differential Pressure Flow Measurement and Control 8. Process Visualization Control 1 9. Pressure Process Control Systems 10. Foundation Fieldbus Process Control 1 11. HART Process Control 1 12. Mastering Programmable Controllers AB CompactLogix L32 13. PLC Process Control - Siemens S7-1200 14. PLC Process Control AB CompactLogix L16 15. Process Control Systems **XII. QUALITY ASSURANCE** 1. Metrology 1 2. Measurement Tools 1 3. Quality Assurance 1 4. Portable Precision Gauging 1 5. Portable Measurement Tools 6. Inspection Techniques 1 7. Surface Plates 8. Gauge Blocks 9. Test Indicators 10. Height Gauges 11. Bench Comparators 12. Optical Comparators 13. Bore Gauges 14. Air Gauges 15. Specialty Micrometers			

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JASPER A. YAUDER, CPA
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ALOBS No. : 02-308403-2022-07-0161
Amount : ₱ 4745 000

PURCHASE ORDER

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Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
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Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		16. Miscellaneous Inspection Instruments 17. ISO 9000 and TS 16949 18. Statistical Process Control 1 19. Statistical Process Control 2 20. Quality Control Concepts **XIII.SAFETY** 1. Safety Practices and Regulations 2. Personal Protective Equipment 3. Hazardous Communication 4. Confined Spaces 5. Lockout/Tagout 6. Accident Response 7. Overhead Crane Safety **XIV.THERMAL** 1. Air Conditioning / Heat Pump 2. Steam Systems 3. Thermal Systems 1 4. Environmental Applications 5. Geothermal 6. Geothermal Troubleshooting 7. Geothermal Desuperheater 8. Geothermal Troubleshooting with Desuperheater 9. Geothermal Flush Cart Learning System 10. Thermal Technology 1 11. Thermal Technology 2 **XV.WORKPLACE EFFECTIVENESS** 1. Enterprise Systems 1 2. Principles of Advanced Manufacturing			

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ENGR. ERIC JUDE S. SCHMIDT /AUG 03 2022

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Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-308403-2022-07-0161
Amount : ₱ 47,705,000.-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

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TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		3. Mathematics 1 4. Trigonometry 1 5. Communication Skills 6. Conflict Resolution 7. Working in Groups Learn through Distance e-Learning and Oxygen's Education • Complete electronic access to all Oxygen Education's learning material, 300 courses, 1100 modules, 3300hours of learning material Interactive multimedia eBooks • Available 24 x 7 for total learning flexibility, anytime, Anywhere! • Includes excellent content management system to administer quizzes, track grades, provide reporting, and much more • Create tailored courses using any of the 1100 modules the possibilities are endless! **Minimum Requirements:** **Windows devices (including Surface tablets):** Windows 10 64-bit (may function under previous versions/different operating systems, but testing & support limited to Windows 10), 8GB RAM Sound card (or onboard sound), Video card (or onboard video) with WebGL support, 64-bit Browser with WebGL 2.0 support, Broadband Internet access (DSL/Cable/T1/etc.) capable of 1Mbps **Mac devices (does NOT include iPads):** macOS 64-bit (may function under different operating systems, but testing & support limited to 64-bit macOS) 8GB RAM Sound card (or onboard sound) Video card (or onboard video) with WebGL support, 64-bit Browser with, WebGL 2.0 support, Recommended browser: Firefox, Broadband Internet access (DSL/Cable/T1/etc.) capable of 1Mbps **Chromebooks (does NOT include other tablets):** ChromeOS 64-			

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Head, Budget Office

ALOBS No. : 22-308003-2022-07-0061
Amount : ₱ 4705000-

PURCHASE ORDER

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Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

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		bit, 6GB RAM Sound card (or onboard sound), Video card (or onboard video) with WebGL support, 64-bit Browser with WebGL 2.0 support, Broadband Internet access (DSL/ Cable/ T1/etc.) capable of 1Mbps Mobile Devices not listed above that may function properly, but are not yet supported (iPad, Galaxy Tab, Fire, etc.): Memory 8GB RAM, Note: Determining RAM on an iPad is problematic. As a reference, 2020 iPads (8th generation) have 3GB RAM; 2020 iPad Pro (4th generation) have 6GB RAM. Various operating systems - under evaluation, Sound card (or onboard sound), Video card (or onboard video) with WebGL support, 64-bit Browser with WebGL 2.0 support, Broadband Internet access (mobile data/Wi-Fi/etc.) capable of 1Mbps **"Smart Simulator for Electrical Machines Training Lifetime License which includes:"** This software should simulate a real electric motor´s workbench so that the student should be able to perform the experiments in the virtual environment in a simple and almost real way, in a way very close to what he/she would do on a real equipment. It must be conceived as a complete course in electric machines to make the student able to solve practical and real assembling problems and to work on several experiments in the virtual equipment and then perform them by submitting the electric assembled machine to different working conditions. The software must have a 3D environment composed by a workbench with electric motor components, power modules, sensors, actuators, and instruments, and all the components should behave and look like real ones, with texture and lightening. It must include a frame with base to fix the			

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JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 02-308403-2022-07-0161
Amount : ₱ 4,705,100-

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Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

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Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
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Date of Delivery:

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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		modules and the machines and must have a set of electric machine components, including but not limited to rotors suitable for AC and DC motors, stators suitable for AC and DC motors, electromagnetic brake, brake support with load cell for measuring the torque, coupling joint for mechanically connecting the rotor to the electromagnetic brake or other components, speed transducer for measuring the motor speed, block with rotation system to lock the motor or turns it manually by means of a crank, brush with brush holder, and supports. The software must also provide the student with the theoretical content that is necessary to perform the experiments, and every experiment must have detailed instructions on how to assemble, wire and to perform it. It must also include the typical modules used in electric machines experiments, including but not limited to: • AC three-phase source, • AC single-phase source, • DC source, • Wattmeters, • Speed Meter, • Torque Meter, • Amperemeters, • Voltmeters, • Starting Rheostat with Resistive Load, • Pole Changing Unit, • Excitation Rheostat with Capacitive Load, • Rotating light synchronoscope, • Pole changing unit, • Star/Delta starter,			

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Conforme:

ENGR. ERIC JOEL S. SOLIMAN / AUG 0 3 2022
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Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 01-308603-2022-07-01161
Amount : ₱ 4703 100-

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

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Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		• Starting rheostat and synchronizer, • Oscilloscope. Besides the mechanical assembly, the software must allow the student to perform the wiring, including the wiring between power supplies and the electric motor, brake, sensors and/or other devices used in each experiment, the connections on the electric motor itself, and the connections between the devices and the measurement modules. The software must have at least 45 different experiments, including but not limited to the following topics: • Basics concepts of an electric machine: ☐ Flux produced by the poles - Main poles ☐ Flux produced by the poles – Interpoles ☐ Main magnetic field - Concurrent series ☐ Intensity of the magnetic field ☐ Induced voltage ☐ Interpole Effect ☐ Rotating magnetic field – three-phase and single-phase rotating fields • Induction motors: ☐ Three-phase squirrel cage motor, 2 poles, 24V Δ ☐ Three-phase squirrel cage motor, 2 poles, 42V Y ☐ Three-phase squirrel cage motor, 2 poles, 24V ΔΔ ☐ Three-Phase squirrel cage motor, 2 poles, 42V YY ☐ Three-Phase squirrel cage motor, 4 poles, 24V Δ ☐ Three-Phase squirrel cage motor, 4 poles, 42V Y ☐ Three-Phase Dahlander motor, 4/2 poles, 42V Δ/YY ☐ Split phase motor			

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ALOBS No. : 02-308603-2022-07-0101
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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		☐ Capacitor start and run motor ☐ Three-phase motor with wound rotor, 2 poles, 42V YY ☐ Phase shifter ☐ Induction regulator ☐ Three-Phase synchronous induction motor, 2 poles, 42V Δ • Direct current motors: ☐ DC motor with separate excitation ☐ DC motor with shunt excitation ☐ DC motor with series excitation ☐ DC motor with compound excitation, long shunt ☐ DC motor with differential excitation, long shunt ☐ DC motor with compound excitation, short shunt ☐ DC motor with differential excitation, short shunt • Commutator motors for alternating current: ☐ Single-phase series motor ☐ Repulsion motor • Synchronous machines: ☐ Winding resistance ☐ No-load test, mechanical losses of the DC motor ☐ No-load test, mechanical and iron losses of the alternator ☐ Short-circuit characteristic ☐ Short-circuit test ☐ Load test ☐ Parallel connection of the alternator with the mains ☐ Alternator as synchronous motor • Direct current generators: ☐ Winding resistance - Armature winding ☐ Winding resistance – Series and interpole windings			

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		☒ Winding resistance - Inductor winding ☒ Test of the no-load motor (Swinburne) ☒ No-load E.M.F. ☒ Excitation characteristic ☒ Separate excitation dynamo ☒ Shunt excitation dynamo ☒ Series excitation dynamo ☒ Compound excitation dynamo The software must guide the student through the learning process automatically by providing the above experiment proposals and, for each experiment, it must automatically verify if the student has performed the mechanical assembly and the wiring correctly, and then if so, it must allow to perform the simulation and measurement by comparing the student's measurements with the expected values for the experiment. When the student finishes an experiment, the software must register the progress locally and in a cloud system so that the student can start the experiment using one computer, and continue somewhere else, using the same or another computer synchronizing the student's progress. The software must have a detailed online help with text and videos made from screen recordings with the software, so that the instructions on how to use it are clear and easy to understand. The software must be delivered always in full version with feature unlock through a cloud system so that any user can download the software from the internet where the school may provide access to users to the software features. It must be possible to select an interface language between English, French, Spanish, and Portuguese. **"Smart Simulator for Process Control Lifetime License"**			

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Head, Budget Office

ALOBS No. : 02-308603-2022-07-0141
Amount : ₱ 47090.00

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		The Virtual Process Control Simulator is a software that has been developed to teach process control techniques in a unique and effective way. With this software, students can improve their individual experience on studying process control in practice. Students will be able to carry out several experiments dealing with the following topics: • control systems, open and closed loop system, • sensors, transducers and actuators, • input and power signal conditioning, • level, flow, pressure, temperature, • error, offset, calibration, response time, ON-OFF control, hysteresis, PID controller, Proportional control (P), Proportional-Integral control (PI), Proportional Integral-Derivative control (PID). This software will be able to reproduce the features and behaviours of the Process Control Trainer. This system can work with or without a PLC. Students can easily implement the controllers using the virtual control modules or connecting the plant to a real PLC or to a SoftPLC, such as Siemens S7-1200/1500, PLCSIM and Codesys. With this type of software, students can learn in their own rhythm and teachers have more time to support the class, manage and improve the process because – unlike any other simple simulator- it grants the followingbenefits: 1) EFFECTIVE GUIDE FOR STUDENTS: possibility to access learning topics, with theory, instructions and experiment proposals. The software includes a virtual version of the Process Control Trainer. 2) AUTOMATIC VALIDATION OF STUDENTS' TASKS: the software automatically verifies if the student completed successfully each task in order to allow him/her to go ahead with the next one.			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme:
ENGR. ERIC JUDE S. SOLIMAN / AUG 0 3 2022
HYTEC POWER, INC.
(Signature over printed name & date)

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JASPER A. YAUDER, CPA
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Amount : ₱ 4705.000

PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		3) TRACKING OF STUDENTS' PROGRESS: the teacher can verify the students' progress at any time by consulting the specific summary in the software or exporting it to a spreadsheet. SOFTWARE DESCRIPTION This software reproduces a process plant and signal, power, control and PLC modules. The process control laboratory is composed of two main sections: the process tank and the sump tank. The PROCESS PLANT is designed to teach the process control principles. The SUMP TANK includes pipelines to process water supply and to drain water out from the process plant. The PROCESS TANK (pressurized vessel) includes the following components: • A level sensor and a metric scale suitable for measuring the water level (cm or mm). • A float switch suitable for detecting the level of water within the pressurized tank. • A heating element. • A temperature sensor (PT100) and a thermometer suitable for measuring the temperature inside the process tank (°C or °F). • A pressure sensor and a pressure gauge suitable for measuring the pressure (bar or psi). • Four types of valves (three manually operated and a controlled one). The SUMP TANK (water tank) and the pipelines include the following components: • A delivery valve (the main water supply valve). • A flow meter turbine (volumetric measuring turbine). • A motor pump with thermal protection. • A visual flowmeter (indicator for flow rate).			

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		• A manually operated valve to reduce the water flow. • A motor valve suitable for controlling the water flow. INSTRUMENTATION AND CONTROL SECTION The CONTROL MODULES include interface signal conditioners for sensors, power drivers for actuators and basic control logic that behaves as either a regulating device or a state-oriented device: CHARACTERISTICS OF THE SIGNAL, POWER AND CONTROL MODULES The process plant has an associated panel that shows the entire process diagram using standard symbols. This is very useful for students to understand the basic concepts of process control. The software is supplied with a detailed on line educational guide. Following the experiments, students will be guided step by step to learn the following activities: • calibration of a sensor, • obtaining the characteristic of a static process and time constant, • control of a process by ON-OFF, Proportional, Proportional-Integral and Proportional Integral Derivative. Through this software, teachers will be able to easily guide students in studying the principles of process control. The main objective of a basic course in process control is to make students able to solve practical and real control problems. The didactic advantage of this trainer is the possibility to investigate the behavior of each process (level, flow, temperature or pressure) or any possible relevant combination. The software guarantees a complete experience in the field of process control. Students can approach this topic starting from the basic concepts of control systems up to designing and tuning controllers for the main four control variables in industries			

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		(level, temperature, pressure and flow). Each experiment is presented to students with its goals and the theoretical concepts necessary to understand the next steps to be taken. Simulator represents closely the main features of a process plant, so that it will be like having a real process control laboratory for each student. CONTROL OPTIONS: PLC, SOFTPLC AND BUILT-INTCONTROL MODULES The process plant represented by the software can be controlled using: The built-in control modules, such as OnOFF, Proportional and PID. An external PLC such as S7-1200/1500. A SoftPLC, such as PLCSIM and Codesys Control. When working with a PLC or SoftPLC, students still need to work on signal and power conditioning in the virtual environment, but instead of using control modules, students will connect the input and output normalized signals to a PLC MODULE and the PLC MODULE will handle the interface with the respective external PLC or SoftPLC. LIST OF EXPERIMENTS • Level sensor settings • Characteristics of the motor of the pump • Characteristics of the pump • Characteristics of the static process • Time constant of the process • ON - OFF control of the level • ON - OFF control of the level with "Sol Valve" • ON - OFF control of the level with "Float Switch" • Closed loop control of the LEVEL ☐ Closed loop Proportional control of the level ☐ Closed loop Proportional-Integral control of the level			

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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		Closed loop Proportional-Derivative control of the level Closed loop Proportional-Integral-Derivative control of the level • Closed loop control of the FLOW Flow sensor Closed loop Proportional control of the flow Closed loop Proportional-Integral control of the flow Closed loop Proportional-Derivative control of the flow Closed loop Proportional-Integral-Derivative control of the flow • Closed loop control of the TEMPERATURE Temperature sensor Measurement of the characteristics of the heating Closed loop Proportional control of the temperature Closed loop Proportional-Integral control of the temperature Closed loop Proportional-Derivative control of the temperature Closed loop Proportional-Integral-Derivative control of the temperature • Pressure sensor Pressure sensor as a level sensor ON - OFF control of the level through the pressure sensor DESCRIPTION OF PERFORMABLE EXPERIMENTS This software grants the possibility to perform 27 practical experiments with progressive difficulties levels. Here follows a short description of some of the performable experiments. Level sensor settings From the beginning of the experiments, students will learn about different types of sensors. Students can learn how to calibrate and use a capacitive fluid level sensor in order to measure the water level and to determine the sensor characteristics. The level			

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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		transducer (L/U) is used to calibrate the level sensor for a correspondence of 1 V to 1 cm Characteristics of the motor of the pump The experiment is very practical because students will learn the control in PWM (Pulse Width Modulation) of a DC motor. Using a classical oscilloscope, students will analyze the control signals of the pump motor. The reference input signal of the motor is a triangular 10Vpp, while the duty cycle of the PWM is modulated from the control panel of the trainer. Characteristics of the pump After running this experiment, students will understand the working principle of a diaphragm pump. They will learn how to compute the flow and how to measure it using the flowmeter in order to draw the characteristic curve of the flow. Characteristics of the static process The main objective of this experiment is to understand how the flow will influence the rising time of the fluid level rate in a level control process. The flow transducer (f/U) is used to calibrate the flow sensor for a correspondence of 1 V output to 0.5 liters per minute. Time constant of the process What is the time constant of a process? How do I calculate it? Students can answer these questions by performing this experiment. The time constant estimation of the water flow in the tank is made as a ratio between the input flow and the draining flow rate. This process is an example of parameter identification. ON - OFF control of the level What are the effects of the hysteresis on the level control? Students will find out while learning how to measure the dynamic response of			

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Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		the process. Students will use the capacitive level sensor to measure the water level in the process tank. This knowledge is very important because, in practical situations, one of the most \widely used types of control is the ON/OFF control. ON - OFF control of the level with the "Sol Valve" In this experiment, students will use the knowledge acquired so far regarding the hysteresis on level control. They will measure the up and down times of the level between start and stop of the electro-valve with a hysteresis of 0%, 15% and 30%. ON - OFF control of the level with the "Float Switch" Students will perform a practical study to maintain constant the level in the tank using an ON-OFF level sensor and the electro valve sol valve. They will learn how to measure the water level variation in time. In order to determine the hysteresis curve for on - off control of the level, students will use the engraved mobile scale or the level sensor and float switch. Closed loop control of the LEVEL Closed loop Proportional control of the level Closed loop Proportional-Integral control of the level Closed loop Proportional-Derivative control of the level Closed loop Proportional-Integral-Derivative control of the level In order to study the closed loop control, students need to check first the effects of the gain on the dynamic response of the system. It is very interesting to observe the output characteristic of the PID controller for different Kp, Kd and Ki constant values. Ziegler-Nichols tuning method is used in tuning of PID controller. The student learn how to determine the PID parameters in order to obtain the controlled level.			

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		Closed loop control of the FLOW Flow sensor Closed loop Proportional control of the flow Closed loop Proportional-Integral control of the flow Closed loop Proportional-Derivative control of the flow Closed loop Proportional-Integral-Derivative control of flow During this experiment, students learn how to measure the water flow rate by using the engraved scale of the direct flow meter or the turbine flow sensor. After analyzing the results in this experiment, students will be able to implement the tuning of the PID control of the system with optimum stability. Temperature sensor Students can learn how to measure the temperature variation in time (using the engraved thermometer scale or the temperature sensor), in order to determine and compute the characteristic curve of the PT100 sensor (RDT). The temperature transducer (u/U) is used to calibrate the temperature sensor for a correspondence of 1V to 10 degrees Celsius. Measurement of the characteristics of the heating In this experiment (similar to the previous one), students will understand the working principle of a resistive temperature sensor in order to measure the temperature in the industrial process tank. Using a classical oscilloscope, students can analyze the wave form of the PWM for the heating element. Closed loop control of the TEMPERATURE ON - OFF control of the temperature Closed loop Proportional control of the temperature Closed loop Proportional-Integral control of the temperature			

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		Closed loop Proportional-Derivative control of the temperature Closed loop Proportional-Integral-Derivative control of the temperature Students will learn that a temperature controller is an instrument used to control temperatures. In the temperature controller system, the controller accepts a temperature sensor as an input (such as an RTD or thermocouple) and compares the actual temperature with the required control temperature or set point. The output is then provided to a control element. After analyzing the results in this experiment, students will be able to tune properly the PID control of the system. Pressure sensor Students will learn how to measure the pressure, using the electronic pressure sensor or pressure gauge scale, in order to determine and compute the characteristic curve of the pressure sensor. The pressure transducer (P/U) is used to calibrate the pressure sensor for a correspondence of 1 V to 0.1 bar. The characteristic of a pressure transducer will be determined. Pressure sensor as a level sensor The main objective of this experiment is to measure the pressure, using the electronic pressure sensor or pressure gauge scale, in order to determine the characteristic curve of the level vs. pressure response. ON - OFF control of the level through the pressure sensor In this experiment, students will perform the operation of a closed loop ON-OFF control system using the pressure sensor as a level sensor. Thanks to the knowledge acquired so far about the effects of the hysteresis on the control, students will be able to control the			

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		pressure. **"Machine Automation Course Lifetime License"** SMART SIMULATOR FOR LEARNING AUTOMATION WITH PLC This is a software that has been developed to teach industrial automation and PLC programming in a unique and effective way. With this software, students can improve their individual experience on studying industrial automation in practice. Students will be able to carry out several experiments dealing with the following topics: • Main concepts related to logic control; • State machine (SFC) approach; • Electric diagram interpretation; • Electric commands for motor engines and pneumatic systems and their interfaces to PLCs; • Programmable logic controllers: hardware and software structure, technical characteristics and specifications, programming languages, main ladder instructions, data handling, math, numeric formats, comparisons, timers and analog interfaces. This software works integrated to a soft PLC (not included) which can be: The Siemens PLCSIM or Codesys Control. 3D INDUSTRIAL ENVIRONMENTS TO PROVIDE REAL PRACTICAL EXPERIENCE TO STUDENTS EFFECTIVE LEARNING WITH GUIDANCE, REAL-LIFE PROJECTS THEORY AND INSTRUCTIONS FROM BASIC TO ADVANCED STUDENT CAN LEARN AND PRACTICE FROM BASIC TO ADVANCED AUTOMATION WITH PLC • Basic Ladder Logic • Scaling • Function Blocks			

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PURCHASE ORDER

Procurement Unit
Tel. No.: 045-606-8142/ 606-8157

DELIVERY DUE DATE: 11/6/22

Supplier : **HYTEC POWER, INC.**
Address : #2 T. Cruz St., Cruzville, Zabarte Rd., Novaliches, Quezon City
Type of Business : Merchandising
TIN No. : 229-283-188-000
Tel. No. : (02) 417-4333/ 417-5435/ 418-7079/ 419-9138/ 419-9166

PR No.: 2021-11-280
PO No.: 2022-305
Date: 7/7/2022
Mode of Procurement: Public Bidding

Gentlemen:

Please furnish this office the following articles subject to the terms and conditions contained herein:

Place of Delivery: **TARLAC STATE UNIVERSITY**
Date of Delivery:

Delivery Term: 90 Calendar Days
Payment Term: N/30

Item No.	Unit	Description	Quantity	Unit Cost	Total Cost
		• Analog Handling • Sequential Function Chart IT INCLUDES ELECTRICAL PANEL, FAULT SIMULATION AND TROUBLESHOOTING • Electric Panel o Energy supply and protection o Circuit breakers o Contactors o Safety relay o 24Vdc o Power supply o PLC o Interface relays, o Connectors o Conductors o Frequency inverters • Electric Diagram Samples • Troubleshooting • Replacement console o Virtual multimeter o Forced signals Other Terms and Conditions: 1. Bidder must submit brochure/catalogue indicating the brand name & model of bid item/s as additional technical requirements failure to submit will be grounds for disqualification. 2. Bidder must have a training center for the testing & checking of goods by the end-user prior to delivery as well as for the pre-training to be conducted at the provider's training center and/or			

Warranty shall be for a period minimum of Three (3) months for expendable supplies, or a minimum period of one (1) Year for non-expendable supplies. In case of failure to make full delivery within the time specified above, a penalty of one-tenth (1/10) of one percent for every day of delay shall be imposed

Very truly yours,

DR. GRACE N. ROSETE
Vice President for Administration
Authorized Official

Conforme:
ENGR. ERIC JUDE S. SOLIMAN / AUG 03 2022
HYTEC POWER, INC.
(Signature over printed name & date)

Bank Account Name: _____
Bank Account Numbe _____
Bank Name: _____
Bank Address: _____

COMMISSION ON AUDIT - TSU
RECEIVED
By: _____ Date: AUG 05 2022 Time: _____

Funds Available:

JASPER A. YAUDER, CPA
Head, Budget Office

ALOBS No. : 12-2081023 2022-07-0161
Amount : ₱ 4705 000