C&G Reg.No : 829468
JPK Centre Code : PD 5690

1Prerequisite:

To study details about this program: SKILLS DIPLOMA IN MECHATRONIC TECHNOLOGY PROGRAMME

Summary of eligible subjects for credit transfer to obtain a diploma certificate & degree credit transfer

Target student: For students who intend to pursue a Degree in Mechatronic in WOU. You may start preparing the necessary details during your diploma studies.

Date: 28 Nov 2024

Introduction:

Launch of new degree courses from Wawasan Open University (WOU) enable candidates to transfer learning credits by compiling the necessary study evidence from their diploma studies in FTC to apply for an internal diploma certificate from WOU, which will also exempt them from certain courses in the degree program.

Major Benefits:

- Students who complete the documentation are able to apply for WOU Skills Diploma in Engineering certification.
- Reduce cost fee and time of study for students to complete degree. [The maximum study duration can be reduced by 1- 1.5 years if all the below subjects qualify for exemption.]

Original Course: C&G 2850 – 88 Level 3 Diploma in Engineering – Maintenance, Installation and Commissioning

Course Credit Redemption: Bachelor of Technology (Honours) in Mechatronic System | WOU (Refer to website for details)

C&G Code	C&G Subject Name	Delivery Mode	Wawasan Open University (WOU) Subject Code	Credit Transfer
301	Engineering Health & Safety	Theory classes	TMS103/02 – Environment, Health & Safety	2
321	Maintenance of Pneumatic & Hydraulic System	Mixed of theory & practical classes	TMS107/03 - Pneumatic and Hydraulic Systems	3
332	Mechatronics System & Fault Finding	Mixed of theory & practical classes	TMS102/03 - Mechatronic Systems Design and Fault Finding	3
			TMS106/03 – Motion Control Technology and Feedback Device	3
			TMS108/03 - PLC and HMI Programming	3
317	Maintenance of Machine System	Mixed of theory & practical classes	TMS112/03 - Mechatronic Systems Integration, Testing and Troubleshooting	3
356	Principles of Maintenance, Installation & Commissioning	Mixed of theory & practical classes	TMS104/03 - Mechatronic Systems Commissioning and Maintenance	3
	Relevant On Job Training		TUC209/06 & TUC210/06: Industrial Training	6 + 6
			Total Credit available for redemption	**32**

Remarks

- Students must document and compile all relevant information (**formal** & **informal learning**) throughout their skills diploma studies. The evidence needs to be submitted for diploma cert redemption / when registering for degree enrolment.

- ❖ **Formal Learning** – Knowledge obtaining during the delivery of classroom settings.
- ❖ **Informal Learning** – Knowledge obtaining from skills, seminars, training, working experience etc.

- APEL C can only be allowed if **students achieve at least 50% of each course learning outcome(CLO)** being assessed.
- Application fee & processing fee must be paid to WOU, and the outcome of the waiver will depend on university's approval.
- It is recommended to consult with the contact person and review all required documents prior to submitting your portfolio, as the processing fee is non-refundable.
- Processing Fee (RM100, non-refundable) and Application Fee (RM200/subject, non-refundable) [Subject to changes by the university]
- Credit Exemption Information Contact Person:
  - ✔ Contact Person: Ms. Denise Tan Xuan Yi
  - ✔ Office Contact: 04-2180465
  - ✔ Email Address: denisetan@wou.edu.my
  - ✔ Working Hours: Weekdays, 10:00 AM – 7:00 PM
- If you have question/ queries, please contact **Audrey 012-4019927**

In short, student will need to prepare below items to redeem skills diploma certificate.

1. **Complete student portfolio.** Refer to Guidelines on student portfolio preparation.
2. **An essay**. Refer to this link for elaboration
3. **Complete 8-9 documentations**, Refer to this link for elaboration

Guidelines on student portfolio preparation

✔ What are student portfolios?

- A collection of student's work & achievement that demonstrates their learning journey, skills, and growth over time.
- Typically included various materials such as assignments, projects which showcase the student progress and accomplishments in different subjects

✔ Who should prepare and what should you include in your student portfolio?

- The **student itself** to document, store and submit.
- Advise to store in both format: hardcopy & softcopy.
- Ensure that varieties of evidence (documents, video, photos etc) are included and all evidence is clear enough for review, with the relevant watermark / logo / letterhead / chop for validation.
- Student portfolio should consist of 3 section which is:
  - ❖ Section 1: Student Personal Particulars
  - ❖ Section 2: Evidence for Formal Learning
  - ❖ Section 3: Evidence for Informal Learning

Note: APEL.C can only be allowed if students achieve **at least 50% of each course learning outcome** being assessed. **[In Short, Section 2 & Section 3 are important because the university will approve the waiver based on submission of content by candidate]**

Section	Things to include in portfolio
Section 1: Student Personal Particulars	Student Name, Date of Birth & Personal Photo
	Course taken during diploma studies, including course name, subjects taken, enrolment month, candidate enrolment number, and other relevant information.
	Employment details, including job enrolment date, job title, and job responsibilities.
Section 2: Evidence of Formal Learning	Written and object documentation for each subject, including exercises, quizzes, assessment reports, and photos of students performing tasks during practical learning sessions and exams. Relevant training which matches the CLO, attach the learning structure and certificate of completion as evidence.
	Examples of documentary: Course Enrolment letter / Attendance Record for each subject / Course Certs/ Google form (to proof that you complete the exercise) / Course Learning Outcome / Recording of Video OR Photos for practical session which is able to prove the work is done by the student itself.
Section 3: Evidence of Informal Learning	The job performance will need to relate to each course learning outcome.
	Provide evidence (written documentation / photos / video recording) that captures your work in action. **[Make sure to inform your superior about your actions before obtaining company documents for filing purposes to avoid confusion]**
	Examples of documentary: Job offer letter indicate your starting work date and title given / Job scope which document your responsibility & job coverage / Emails OR WhatsApp's conversation indicate that you are performing relevant technical task / Any handbook (manual, Work Instruction, guideline) documentary which able to be as proof etc.

Essay: Write an essay to describe and elaborate on:

Description about current Job Scope, Responsibility & Roles	❖ May refer to job description as evidence.
	❖ Some basic descriptions / elaboration to explain according to work done are required.
	❖ Include below details:
	  ❖ On which year & month you had enrol to your current job and what job title you are granted.
	  ❖ Please aware that job description should at least include below aspect:
	  • Company Logo
	  • Position title with department
	  • Candidate date of report
	  • Candidate task & responsibility

Description about job exposure, competencies/ skills gained	**Job exposure:** Current working exposes you to which industry and what insight that you had gain from your current work.
	For example: ✔ My role as a technical coordinator allows me to expose working with other role players, varies from technician to engineer and project manager. Each of them contributes their field of expertise, which I gain knowledge from resources planning, project management, technical & maintenance skills etc.

	✔ I was able to participate in conference meetings which involved different teams, and they came across from different countries. I had learned to become a team player in which each individual played their significant roles and to ensure the message/ information had been delivered in an efficient manner/ effectively.
	Job competencies / Skills gained: what skills you require/gain for you to complete your current job.
	For example: ✔ **PM/PdM Planning Skills** (Preventive maintenance (PM)/ Predictive maintenance (PdM) skills. – Plan and schedule preventive and predictive maintenance activities based on equipment performance data, manufacturer recommendations, and historical maintenance records. ✔ **Troubleshooting and Root Cause Analysis** – Perform this action when there is a machine breakdown which require me to perform troubleshooting to analyse the root cause of defect. This action will enable me to decide and determine the next course of action. (Inform superior to schedule maintenance or other actions etc)

Guideline for 8 documents

Students can obtain the form from this link: https://drive.google.com/drive/folders/1bB7cEBiaYhpaw2x8FcZUsjy0vRPJLtpw?usp=sharing

Course Learning Outcome for 301 / TMS103
1. Explain the concepts of engineering health and safety, as well as risk reduction (C2, PLO1) 2. Demonstrate an approach to hazard identification, risk assessment, risk control in workplace (A3, PLO9) 3. Demonstrate awareness of the ethical responsibility to safety in the workplace and hazard prevention measures (A3, PLO11)

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

- **Explain the concepts of engineering health and safety, as well as risk reduction解释工程健康和安全以及降低风险的概念**
  - Student able to explain the cause and effect of accident. To prevent the loss causes from an accident, prevention action is required.
  - Students must demonstrate the ability to identify potential issues that may arise in their job (risk detection) and implement preventive actions. These actions will be recognized as effective risk reduction measures.
  - Able to link this approach back to course learning outcome of this subject.
- **Demonstrate an approach to hazard identification, risk assessment, risk control in workplace 展示工作场所的危害识别、风险评估、风险控制方法**
  - Students need to be able to demonstrate the ability to identify a potential hazard in your workplace, analyze and make a risk assessment on the detected hazard.
  - Students need to able to perform the accident and emergency procedures to resolve/reduce the risk in the workplace.
- **Demonstrate awareness of the ethical responsibility to safety in the workplace and hazard prevention measures展示对工作场所安全和危害预防措施的道德责任意识**
  - Students need to be able to demonstrate that they are implementing ethical responsibility in the workplace.
  - Example: Able to demonstrate using PPE when performing certain jobs. / Able to explain and demonstrate they comply with lifting operations and equipment regulations.

Justification of claims which will divide into 4 sectors and the requirement respectively				
Learning Experience	**Justification of Claims / Evidence**			
	Acceptability可接受性	**Sufficiency充足性**	**Authenticity真实性**	**Currency**
Learning experience forms the core of the portfolio. The language you use and details you provide will show the Assessor what you know. 学习经验构成了作品集的核心。你所使用的语言和提供的细节将向评估者展示你所掌握的知识。 ***Expectations:*** ● *Elaborate on the **most recent** (e.g. within the last six months) experience, which can demonstrate the achievement of each CLOs or competences, separately. 详细阐述最近的经验(例如, 过去六个月内), 可以单独展示每个课程学习目标(CLOs)或能力的达成。* ● *Include information regarding **where** and **when** the learning experience occurred. 包括关于学习经验发生的地点和时间的信息* ● *Justify each claim with supporting documentation. Attach as appendix, where applicable. 用支持性文件证明每一个声明。必要时附在附录中。* ***Notes:*** ● *Be concise but informative. 简明扼要, 但要信息丰富。* ● *Verify your claims/evidence in the "Justification of Claims/Evidence" column based upon the four criteria provided. 根据提供的四个标准, 在"声明/证据的验证"栏目中验证你的声明/证据。*	*Is the evidence presented **reliable** (the assessment can be repeated with the same outcomes) and **valid** (the assessment must be able to identify the knowledge and skills it purports to assess)?* *学生需确保所提交/抒写的内容是**可靠的、稳定的**(即便是重复评估也可以获得相同的结果)* *学生需确保所提交/抒写的内容是**真实的**(是可以评估/识别学生现在所具备的知识/技能*	*Is the evidence provided sufficient to justify the claims?* *学生需确保所提交的证据/证明是充足的。*	*Can the evidence demonstrate how your own effort and experience or subsequent learning translates into achievements?* *学生需确保所提交的证据是可以证实是学生通过自己的努力和工作经验而转化成你如今的成就*	*Does the evidence reflect the currency of knowledge/skills as required by the discipline of the course?* *学生需确保所提交的证据将会反映出这个学科所要求的知识和技能是跟得上时代/科技的变化。*

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Sample of elaboration referring to Course Learning Outcome for 301 / TMS103 [Case Study 案例研究样本 – A sample for reference]				
1. CLO1: Explain the concepts of engineering health and safety, as well as risk reduction (C2, PLO1) 2. CLO2: Demonstrate an approach to hazard identification, risk assessment, risk control in workplace (A3, PLO9) 3. CLO3: Demonstrate awareness of the ethical responsibility to safety in the workplace and hazard prevention measures (A3, PLO11)				
Learning Experience	Justification of Claims / Evidence			
	Acceptability I have learned this through my former studies or working career and can provide paper evidence (Please substantiate with the relevant evidences & label them accordingly)	**Sufficiency** I know most of this but I have no paper evidence	**Authenticity** I am willing to complete a taskor assignment to show I have learned this (Please list down examples)	**Currency** I really need to take the module
CLO1: Explain the concepts of engineering health and safety, as well as risk reduction All employees are required to attend and pass the National Institute for Occupational Safety and Health (NIOSH) training session before joining the company. For candidates involving in technical roles, participation in company orientation is mandatory, which a briefing on the company's floor plan is conducted to the candidate as there are certain areas in the production will be restricted, and appropriate safety signs are displayed in the production zones. Each candidate will receive a toolbox with the necessary tools. Personal Protective Equipment (PPE), such as safety shoes, will also be provided and must be worn when entering production areas.	*Please refer to **Attachment 1** for NIOSH Badge.* ***Attachment 2** for the course structure* *NIOSH-PDD-CSPS-LR.pdf* ***OR*** *Please refer to Attachment 1 which consist of C&G certs for subject health & safety* ***OR*** *Please refer to attachment 1 which consist of the candidate assessment result. [For candidate which do not enrol in C&G examination, they need to undergo & pass the internal assessment]*	*To able to attach (if any documents which able to proof that the candidate had undergo):* *@ Company Orientation induction plan which briefs the staff regarding info regarding health & safety* *@ Production floor plan which included safety sign* *@ Any documents which guide the staff on the appropriate wearing of PPE* *With some explanation/ elaboration on the action done by the candidate.*	*To able to attach (if any):* *@ Student using tools from toolbox to conducting a job* *@ Student wearing appropriate PPE when conducting the job* *@ Safety sign can be located in the photo capture.* *With some explanation/ elaboration on the action done by the candidate.*	*As a candidate working in the technical field, I will need to ensure that I reattend the NIOSH course yearly and was able to pass the test before the given expiry date.*
CLO2: Demonstrate an approach to hazard identification, risk assessment, risk control in workplace My role as an assembly technician involves interpretation of the electrical schematic drawings and connect the wires according to the electrical schematic	*Please refer to the attached document, which includes my job title and job description outlining my responsibilities and scope of work.*	*Any written documentation (such as email/ WhatsApp's) which able to proof that you detect the hazard (wrong connection of wires)*	*Any pictures/ video (with date) shows the candidate holding the cables with the correct labelling (input output cables label & marked)*	

Sample of elaboration referring to Course Learning Outcome for 301 / TMS103 [Case Study 案例研究样本 – A sample for reference]

1. CLO1: Explain the concepts of engineering health and safety, as well as risk reduction (C2, PLO1)
2. CLO2: Demonstrate an approach to hazard identification, risk assessment, risk control in workplace (A3, PLO9)
3. CLO3: Demonstrate awareness of the ethical responsibility to safety in the workplace and hazard prevention measures (A3, PLO11)

Learning Experience	Justification of Claims / Evidence			
	Acceptability I have learned this through my former studies or working career and can provide paper evidence (Please substantiate with the relevant evidences & label them accordingly)	**Sufficiency** I know most of this but I have no paper evidence	**Authenticity** I am willing to complete a taskor assignment to show I have learned this (Please list down examples)	**Currency** I really need to take the module
drawings. The complexity of the machine design with many components located in the system will affect the wiring diagram layout. requiring connections between multiple modules. There is a risk of incorrect wire connections to the wrong terminal/connection, which can lead to power errors that may damage mechanical modules. To mitigate this risk, we have implemented preventative measures, including labelling the input and output connections on the cables before assembly.	*With some explanation/ elaboration on the action done by candidate.*	*Able to attach a small section of writing diagram and label the wrong connection part* *With some explanation/ elaboration on the action done by candidate.*	*The assembled machine system consists of the labelled wires.* *With some explanation/ elaboration on the action done by candidate.*	
CLO3: Demonstrate awareness of the ethical responsibility to safety in the workplace and hazard prevention measures *In line with ethical responsibilities and safety standards, different coloured wires were used to distinguish various component connections in the electrical schematic diagram, reducing the risk of confusion. Once the machine assembly is completed, it must undergo testing and commissioning to ensure it is fully operational before being signed off and handed over to the customer. This process requires obtaining the necessary permits and approvals from management, ensuring relevant authorities are informed. A notice for the machine testing is issued, and the testing area is isolated with appropriate signage and warning lines to prevent unauthorized personnel from entering.*	*@ Attach a sample of electrical wiring documents with different colours of wires to connect the modules.*	*@ List down necessary process of obtaining necessary permit to perform testing & commissioning of machine.* *@ Attach some documents for evidence. [Ex: Filled up application form & email to relevant authorities to inform them for approval]* *With some explanation/ elaboration on the action done by candidate.*	*@ Attach some documents [Official notice on machine testing will be conducted]* *@ Attach some documents [Photos on the testing area is isolated with appropriate signage and warning lines]* *With some explanation/ elaboration on the*	*@ Attached with some video / photos on candidate performing lockout procedure before the test is start.* *With some explanation/ elaboration on the action done by candidate.*

Sample of elaboration referring to Course Learning Outcome for 301 / TMS103 [Case Study 案例研究样本 – A sample for reference]				
1. CLO1: Explain the concepts of engineering health and safety, as well as risk reduction (C2, PLO1) 2. CLO2: Demonstrate an approach to hazard identification, risk assessment, risk control in workplace (A3, PLO9) 3. CLO3: Demonstrate awareness of the ethical responsibility to safety in the workplace and hazard prevention measures (A3, PLO11)				
Learning Experience	Justification of Claims / Evidence			
	Acceptability I have learned this through my former studies or working career and can provide paper evidence (Please substantiate with the relevant evidences & label them accordingly)	Sufficiency I know most of this but I have no paper evidence	Authenticity I am willing to complete a taskor assignment to show I have learned this (Please list down examples)	Currency I really need to take the module
Additionally, it is essential to perform the lockout procedure during testing and machine commissioning to ensure safety.			*action done by candidate.*	

Course Learning Outcome for 356 / TMS104

1. Demonstrate the ability to compile information and processes for equipment commissioning and maintenance (C3, PLO2)
2. Perform the commissioning and maintenance of a mechatronic system with the given procedures and equipment. (P3, PLO3)
3. Demonstrate the ability to communicate commissioning and maintenance status to the stakeholders (A3, PLO4)

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

- Demonstrate the ability to compile information and processes for equipment commissioning and maintenance演示编制设备调试和维护的信息和流程的能力。
  - Student able to perform equipment commissioning and maintenance of machine system.
  - Student able to locate and record down the necessary information when performing commissioning and maintenance task.
  - Student able to describe and elaborate on the action that student had perform accordingly.
- Perform the commissioning and maintenance of a mechatronic system with the given procedures and equipment. 根据给定的程序和设备，对机电系统进行调试和维护。
  - Student able to follow the given procedure stated in the work instruction to perform commissioning and maintenance of a mechatronics system.
  - Student able to select the appropriate equipment and perform commissioning and maintenance of a mechatronics system.
- Demonstrate the ability to communicate commissioning and maintenance status to the stakeholders演示向利益相关者传达调试和维护状态的能力。
  - Student able to plan the necessary item that need to perform before conducting the commissioning and maintenance activities
  - Student able to communicate with each party so each party are aligning with the upcoming activities

- Student able to document the outcome after performing the maintenance activities and acknowledge the relevant parties involved

Course Learning Outcome for 317 / TMS112

1. Demonstrate the ability to compile test requirements and the performance test measurements (C3, PLO2)
2. Perform troubleshooting of a mechatronic system with the given requirements and equipment. (P3, PLO3)
3. Demonstrate the ability to communicate test and troubleshooting results to the stakeholders (A3, PLO4)

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

- Demonstrate ability to compile test requirements and the performance test measurements演示编制测试需求和性能测试指标的能力
  - To able to compile test requirement, student need to understand the require criteria then only able to proceed for defining and generating test requirement
  - For example:
    - A new request is assigned to student which he/she need to obtain production environment temperature data from the designated machine.
    - Student need to compile test requirements (step by step guidance on the procedure to obtain data from the machine)
    - Student need to reset and ensure the machine is functional once data obtained.
  - Student able to perform functional testing on the machine and collect the data to verify that the machine is function as usual.
- Perform troubleshooting of a mechatronic system with the given requirements and equipment. 根据给定的要求和设备，对机电系统进行故障排除。
  - Student able to detect a fault occurring on the mechatronics system
  - Student able to communicate with necessary authorities before obtaining approval to perform troubleshooting.
  - Student able to follow the given procedure to perform troubleshooting on the mechatronic system.
- Demonstrate ability to communicate test and troubleshooting results to stakeholders演示向相关方传达测试和故障排除结果的能力

- Student able to plan the necessary item that need to perform before conducting the commissioning and maintenance activities
- Student able to plan the necessary item that need to perform before conducting the commissioning and maintenance activities
- Student able to communicate with each parties so each parties are align with the upcoming activities
- Student able to document the outcome after performing the maintenance activities and acknowledge the relevant parties involved

Course Learning Outcome for 321 / TMS107

1. Explain the basic principles of pneumatics and hydraulics (C2, PLO1)
2. Perform pneumatic and hydraulic system assembling and servicing. (P3, PLO3)
3. Evaluate a fluid power system to solve the automation problem and predict the responses (C5, PLO2)

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

 Explain the basic principles of pneumatics and hydraulics解释气动和液压的基本原理

- Students must attend classes to ensure able to pass the theory examination, so it demonstrates the understanding of this outcome

 Perform pneumatic and hydraulic system assembling and servicing. 进行气动和液压系统的组装和维护

- Student able to review the diagram to prepare the necessary tools and equipment to perform the disassemble and servicing.
- Student able to locate and order replacement part if there are part that need to be replace.
- Student able to disassemble the system by following safety procedure, locate the necessary part and perform maintainence & servicing
- Student able to reassemble the system and ensure its operating well after performing the maintainence, including completing maintainence report.

 Evaluate a fluid power system to solve the automation problem and predict the responses评估流体动力系统以解决自动化问题并预测其响应

- Student able to define the problem and analyse the system components and its design.
- Student able to perform calculation on its key parameters such as pressure, flow rate by using relevant formulas
- Student able to perform testing on simulate different scenario to obtain the relevant data according to the setting.

- Perform recording & documentation of the whole process and collect the necessary data as record.

Course Learning Outcome for 332 / TMS102 (Come with a bundle for subject 332)

1. Demonstrate the ability to compile requirements of a mechatronic unit and the performance measurements (C3, PLO2)
2. Perform the design of a mechatronic system with the given requirements and equipment. (P5, PLO3)
3. Demonstrate the ability to communicate technical design details to the stakeholders (A3, PLO4)

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

 Demonstrate the ability to compile requirements of a mechatronic unit and the performance measurements演示编制机电单元需求和性能测量的能力。

- Students must attend classes to ensure able to pass the theory examination, so it demonstrates the understanding of this outcome

 Perform the design of a mechatronic system with the given requirements and equipment. 根据给定的要求和设备，进行机电系统的设计。

- Students need to communicate / discuss with superior to understand the requirements of the system before performing the design.
- Student able to select the suitable design software to design the mechatronics system
- Student able to perform relevant calculations, depending on the type of system to be designed and record down the necessary data in the design.
- Draft the design and submit it for approval from a supervisor before creating the final design.

 Demonstrate the ability to communicate technical design details to the stakeholders演示向利益相关者传达技术设计细节的能力。

- Student able to demonstrate their design outcome with their superior and gain approval from their superior.

- Student might need to perform a presentation to their superior before the buyoff so presentation slide should be prepared before the presentation.

Course Learning Outcome for 333 / TMS108 (Come with a bundle for subject 332)

1. Apply the theoretical knowledge of PLC and HMI in automation system using industry equipment (C3, PLO1)
2. Demonstrate the effectiveness of PLC programming with HMI design (P5, PLO3)
3. Display the capability to apply the PLC and HMI in industry (P4, PLO6)

Remarks: PLC - Programmable Logic Control ; HMI - Human Machine Interference

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

✔ Apply the theoretical knowledge of PLC and HMI in automation system using industry equipment 使用行业设备，将PLC和HMI的理论知识应用于自动化系统。

Assuming students currently handle industry equipment which is equipped with PLC function.Student need to demonstrate the ability to apply theoretical knowledge to program the system. (Explain the system using theory knowledge)

To enhance operational effectiveness, the industry equipment is upgraded and adds an HMI function. (For enhancement)

✔ Demonstrate the effectiveness of PLC programming with HMI design演示PLC编程与HMI设计的有效性

Comparison of efficiency between the two industry equipment. (Ie: Efficiency of the module using PLC & Efficiency of module using PLC + HMI function)

Support this statement with attachment of relevant data (calculation to proof & compare both module efficiency percentage).
Conclude your findings.

✔ **Display the capability to apply the PLC and HMI in industry展示在工业中应用PLC和HMI的能力**

Students are able to perform PLC & HMI programming to the industry equipment.

Relevant article : What is HMI? Human Machine Interface

Course Learning Outcome for 304 / TMS106 (Come with a bundle for subject 332)

1. **Explain the principle of automation process control. (C3, PLO1)**
2. **Perform control system installation and maintenance. (P5, PLO3)**
3. **Design industrial control systems to solve automation problems. (C6, PLO7)**

Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

- **Explain the principle of automation process control. 解释自动化过程控制的原理。**
  - Students must attend classes to ensure they are able to pass the theory examination, so it demonstrates the understanding of this outcome.
- **Perform control system installation and maintenance. 进行控制系统的安装和维护。**
  - This section will be divided into two parts: Control System Installation and Control System Maintenance. Testing and commissioning of the system after installation are necessary to ensure that the system is operational.
  - Students will be able to prepare the necessary tools and equipment required for the installation of the control system and document them in the relevant forms.
  - Student able to study & follow WI documents to perform system installation.
  - Student able to perform testing & commissioning on the system to ensure it is functionable before proceed for superior buyoff.

- Student able to **perform routine maintenance** according to the maintainence schedule.
- Student able to review the diagram to prepare the necessary tools and equipment to perform the disassemble and servicing.
- Student able to locate and order replacement part if there are part that need to be replace.
- Student able to disassemble the system by following safety procedure, locate the necessary part and perform maintenance & servicing
- Student able to reassemble the system and ensure its operating well after performing the maintainence, including completing maintainence report.

 Design industrial control systems to solve automation problems. 设计工业控制系统以解决自动化问题。

- Students need to communicate / discuss with superior to understand the requirements of the system before performing the design.
- Student able to select the suitable design software to design the mechatronics system and give reason on the selection.
- Student able to perform relevant calculation, depending on the type of system to be design and record down the necessary data in the design.
- Draft the design and submit it for approval from a supervisor before creating the final design

Course Learning Outcome for Industrial Training – TUC209/06
1. Demonstrate proficiency in interpersonal skills while working in a team. (A3, PLO5) 2. Influence the decision-making process by displaying self-reliance when working independently or in a team. (A5, PLO8) 3. Integrate personal skills seamlessly into work place practices by utilising available resources (A4,PLO9) 4. Comply with the ethical basis of professional practice in relevant industry
Elaboration on the Course Learning Outcome and how students can connect it to current job scope.

➔ **Demonstrate proficiency in interpersonal skills while working in a team.**
- Student should able to show evidence that they are able to cooperate with each other (colleague, superior , manager) by working in a team to complete a task

➔ **Influence the decision-making process by displaying self-reliance when working independently or in a team.**
- Student should be able to show evidence that they are able to participate in discussion and demonstrate the interaction among each member, contributing his opinion and thought to influence the decision making process.

➔ **Integrate personal skills seamlessly into work place practices by utilising available resources (A4,PLO9)**
- Student should be able to show evidence that have personal skills such as communication skills , interpersonal skills, self management, critical thinking and problem solving skills into daily workplace practices

➔ **Comply with the ethical basis of professional practice in relevant industry**
- Student should be able to demonstrate the knowledge of professional ethics and show evidence that they comply with the regulations during handling issue/object/item in workplace.

Write and submit at least a 500-word report based on the headings below within the stipulated timescale:
Report Title:
Recommended headings/sections:
1. **Interpersonal skill**
2. **Working independently/team**
3. **Personal skills**
4. **Ethical practice**