Australian Industry and Skills Committee

UEE INSTRUMENTATION AND CONTROL

Case for Change

Name of allocated IRC: Electrotechnology
Name of the SSO: Australian Industry Standards

1. Administrative information

*For a list of the products proposed to be reviewed as part of this project, please see **Attachment A**.*

Name of IRC(s):	Electrotechnology
Name of SSO:	Australian Industry Standards

1.1 Name and code of Training Package(s) examined to determine change is required

UEE Electrotechnology

2. The Case for Change

*For information on the job roles to be supported through the proposed qualifications updates, enrolments data, completion rates, and the number of RTOs delivering these qualifications please see **Attachment B**.*

2.1 Rationale for change

During transition of the UEE Training Package several issues were identified by stakeholders which fell outside of the scope of the transition project.

It was identified that all qualifications related to Instrumentation and Control were no longer fit for purpose because they reference outdated technology no longer used by industry. The review will update these qualifications and related units and Skill Sets to reflect current technologies, industry practices and regulatory requirements related to selecting, installing, setting up, testing, fault finding, repairing and maintaining systems and devices for measurement and recording of physical/chemical phenomenon and related process control.

Most of this content was last updated over 10 years ago. Instrumentation and Control systems have evolved significantly since that update.

All Instrumentation and Control content was a straight transition of content into the new templates for compliance with the 2012 Standards for Training Packages. The transition project did not allow for a review of content.

2.2 Evidence for change

Many qualifications within the UEE Training Package have not been updated for at least ten years, with some content not looked at in any meaningful way since the 1990s. Electronics and communications systems have evolved significantly during this time, with digital communication being more broadly embraced as a means of doing business, particularly during the COVID pandemic, creating opportunities for more technicians in the electrotechnology field.

Technologies and innovations related to instrument and control have evolved significantly in recent years. Programmable Logic Controllers (PLC) constitute an important aspect of machinery operations and automation. They exchange information with SCADA to provide an accurate picture of operations including maintenance and repairs. New advancements will lead to a greater utilisation of data analytics, improved efficiency and safety, and increased productivity.

2.3 Consideration of existing products

Existing units of competency will be reviewed to bring them in line with current industry practice.

The suitability of units that can be imported from other industry training packages to cover transferable skills will be considered. These imports will be used to replace existing UEE Units of competency where the Technical Advisory Committee (TAC) considers it appropriate.

2.4 Approach to streamlining and rationalisation of the training products being reviewed

The units to be reviewed in this project primarily cover specific technical skills and knowledge required of workers.

Imported units will be considered where possible for transferrable skills and knowledge.

Any nested content contained in qualifications in this pathway will be removed and replaced with entry requirements or replaced.

3. Stakeholder consultation

3.1 Stakeholder consultation undertaken in the development of Case for Change

*For a full list of industry-specific stakeholders that actively participated in the stakeholder consultation process undertaken to develop the Case for Change, please see **Attachment C**.*

The need for a review of this qualification was identified during the broad consultation conducted for Release 2.0 of the UEE Electrotechnology Training Package.

Development of the Case for Change involved consultation with stakeholders via the following communication mechanisms:

- Stakeholder webinars
- Face to Face meetings (Virtual)
- AIS Website
- Stakeholder networks
- Teleconferences
- Emails

The work was outlined during a webinar which included representatives from all States/Territories and regional areas of those jurisdictions. Feedback on the proposed work was invited during the webinar.

The work was posted in the Engagement Hub of the AIS website and feedback invited.

Notification of the opportunity to provide feedback through the Electrotechnology webinar, or in writing through the Engagement Hub, was provided to over 1,100 Electrotechnology sector stakeholder subscribers.

3.2 Evidence of Industry Support

*For a list of the issues raised by stakeholders during consultation and the IRC's response to these, please see **Attachment D.***

No objections to the proposed review were raised during the consultation process. There is strong support for the review because the current qualifications and units of competency are not fit for purpose and their content significantly out of date.

The work was outlined during a webinar conducted for the Electrotechnology industry on 26 March 2021 which had 80 participants. Abroad question about the approach that will be used for the review was posed in the Q & A section of the webinar indicating stakeholder interest in the work. The proposed work was also detailed in the Engagement Hub of the AIS website for stakeholders to review and provide feedback, and no issues were raised in response.

3.3 Proposed stakeholder consultation strategy for project

*Note: For a full list of industry-specific stakeholders who are planned to be contacted to participate in the stakeholder consultation process undertaken for this project, please see **Attachment E**.*

Key Industry stakeholders will be identified in consultation with industry regulators, associations, and the Electrotechnology IRC.

A general invitation to participate on the project Technical Advisory Committee (TAC) will be sent to all Electrotechnology subscribers. Targeted invitations will also be sent to known technical experts.

AIS, on behalf of the Electrotechnology IRC, will promote the opportunity to contribute through stakeholder webinars, the AIS website, EDM's, AIS newsletter and public notifications. Stakeholders will also be notified of key milestones throughout the life of the project, including requests for feedback on draft materials.

Stakeholder engagement and consultation will occur over the life of the project via a combination of the following methods:

- Direct engagement: Face to face consultations, Site visits, Phone, emails, video/teleconferencing meetings
- Industry forums and conferences
- Webinars
- Online feedback mechanisms
- STA direct engagement

Given the size of Australia and all stakeholders are not centrally located in major cities, a range of consultation strategies will be used so stakeholders in rural, regional and remote areas, and in smaller jurisdictions have multiple avenues to provide feedback.

This includes but is not limited to, online/video consultation, email correspondence and promotional activity via targeted communications including social media. A recently developed Engagement hub on the AIS website provides a one stop portal for information about how all stakeholders can participate and inform Training Package development work.

4. Licencing or regulatory linkages

No licencing or regulatory implications.

5. Project implementation

5.1 Prioritisation category

It is proposed that this be complex review conducted over an eighteen-month period to enable considered review of a large amount of highly technical content.

Release 2.0 of the UEE Training Package was primarily a transition project and did not include the review of content in its scope. The need for this review was identified during the transition of UEE11 content which was identified as substantially out of date.

5.2 Project milestones

Key project milestones include:

- AISC project approval: June 2021
- Technical Advisory Committee (TAC) formed: August 2021
- Draft 1 consultation: April-May 2022
- Stakeholder validation: August-September 2022
- Quality Assurance: September-October 2022
- Final consultation with states and territories: October-November 2022
- Case for Endorsement submitted for approval: 31 December 2022

5.3 Delivery or implementation issues
None have been identified to date.

6. Implementing the Skills Minister's Priority reforms for Training Packages (2015 and October 2020)

The project submission will support industry's expectations for training delivery and provide a revised Companion Volume Implementation Guide (CVIG) to support delivery of the new products.

Consideration of imported units will be a focus of this project.

Existing Skill Sets will be updated, and possibly new ones created if required.

This Case for Change was agreed to by the Electrotechnology IRC

Name of Chair	
Signature of Chair	
Date	

Attachment A: Training Package components to change

Australian Industry Standards

Contact details: David Dixon, Chief Operating Officer

Date submitted: TBA

Note: qualifications where the code is marked with * are not being reviewed, but contain core units that are being reviewed as part of this project, as such will need to be submitted for endorsement due to the update.

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Qualification	UEE31220Y	Certificate III in Instrumentation and Control	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Qualification	UEE40420Y	Certificate IV in Electrical - Instrumentation	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Qualification	UEE42220Y	Certificate IV in Instrumentation and Control	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Qualification	UEE43220Y	Certificate IV in Industrial Automation and Control	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Qualification	UEE50220Y	Diploma of Electrical and Instrumentation	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Qualification	UEE51020Y	Diploma of Instrumentation and Control Engineering	05/Oct/2020 - Transition	**Update**

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Qualification	UEE60620Y	Advanced Diploma of Industrial Electronics and Control Engineering	05/Oct/2020 - Transition	**Update**
6	*Instrumentation and Control*	*Qualification*	** UEE40920Y*	*Certificate IV in Industrial Electronics and Control*	*05/Oct/2020 - Transition*	***Update***
6	*Instrumentation and Control*	*Qualification*	** UEE41120Y*	*Certificate IV in Electrical - Lift Systems*	*05/Oct/2020 - Transition*	***Update***
6	*Instrumentation and Control*	*Qualification*	** UEE50920Y*	*Diploma of Industrial Electronics and Control Engineering*	*05/Oct/2020 - Transition*	***Update***
6	Instrumentation and Control	Unit	UEEIC0001Y	Analyse complex electronic circuits controlling fluids	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0002Y	Assemble, enter and verify operating instructions in microprocessor equipped devices	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0003Y	Assist in commissioning process and instrumentation control systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0004Y	Calibrate, adjust and test measuring instruments	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0005Y	Configure and maintain industrial control system networks	05/Oct/2020 - Transition	**Update**

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Unit	UEEIC0006Y	Design and configure human-machine interface (HMI) networks	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0007Y	Design and use advanced programming tools, PC networks and HMI Interfacing	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0008Y	Design electronic control systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0009Y	Develop an electrical integrated system interface for access through a touch screen	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0010Y	Develop and test code for microcontroller devices	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0011Y	Develop electrical integrated systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0012Y	Develop structured programs to control external devices	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0013Y	Develop, enter and verify discrete control programs for programmable controllers	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0014Y	Develop, enter and verify programs in supervisory control and data acquisition systems	05/Oct/2020 - Transition	**Update**

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Unit	UEEIC0015Y	Develop, enter and verify word and analogue control programs for programmable logic controllers	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0016Y	Diagnose and rectify faults in a.c. motor drive systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0017Y	Diagnose and rectify faults in d.c. motor drive systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0018Y	Diagnose and rectify faults in digital controls systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0019Y	Diagnose and rectify faults in servo drive systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0020Y	Fault find and repair analogue circuits and components in electronic control systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0021Y	Find and rectify faults in process final control elements	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0022Y	Install instrumentation and control apparatus and associated equipment	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0023Y	Install instrumentation and control cabling and tubing	05/Oct/2020 - Transition	**Update**

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Unit	UEEIC0024Y	Plan the electrical installation of integrated systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0025Y	Provide solutions to extra-low voltage (ELV) electro-pneumatic control systems and drives	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0026Y	Provide solutions to fluid circuit operations	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0027Y	Provide solutions to pneumatic-hydraulic system operations	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0028Y	Provide solutions to problems in industrial control systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0029Y	Set up and adjust PID control loops	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0030Y	Set up and adjust advanced PID process control loops	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0031Y	Set up and configure human-machine interface (HMI) and industrial networks	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0032Y	Set up electronically controlled robotically operated complex systems	05/Oct/2020 - Transition	**Update**

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Unit	UEEIC0033Y	Set up gas analysis measuring and control instruments	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0034Y	Set up industrial field control devices	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0035Y	Set up scientific analysis measuring and control instruments	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0036Y	Set up water analysis measuring and control instruments	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0037Y	Set up weighting measuring and control instruments	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0038Y	Solve problems in density/level measurement components and systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0039Y	Solve problems in flow measurement components and systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0040Y	Solve problems in polyphase electronic power control circuits	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0041Y	Solve problems in pressure measurement components and systems	05/Oct/2020 - Transition	**Update**

Project number	Project Name	Qualification/ Unit / Skillset	Code	Title	Details of last review *(endorsement date, nature of this update transition, review, establishment)*	Change Required
6	Instrumentation and Control	Unit	UEEIC0042Y	Solve problems in single phase electronic power control circuits	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0043Y	Solve problems in temperature measurement components and systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0044Y	Troubleshoot measuring and analysis systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0045Y	Troubleshoot medical equipment control systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0046Y	Troubleshoot process control systems	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0047Y	Use instrumentation drawings, specifications, standards and equipment manuals	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0048Y	Verify compliance and functionality of instrumentation and control installations	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0049Y	Manage instrumentation and control projects	05/Oct/2020 - Transition	**Update**
6	Instrumentation and Control	Unit	UEEIC0050Y	Plan instrumentation and control projects	05/Oct/2020 - Transition	**Update**

Attachment B: Job role, enrolment information, the number of RTOs currently delivering these qualifications

Please set out the job roles to be supported through the updated qualifications, enrolment data over the past three years in which data is available for each qualification, completion rates for each qualification, and the number of RTOs delivering these qualifications.

Job role	Qualification to be updated to support the job role	Enrolment data (for the past three years)	Completion rates (for the past three years)	Number of RTOs delivering (for the past three years)
342315 Electronic Instrument Trades Worker (Special Class)	UEE31220Y Certificate III in Instrumentation and Control	2634	1102	19
341111 Electrician (General)	UEE40420Y Certificate IV in Electrical - Instrumentation	3824	1810	6
342315 Electronic Instrument Trades Worker (Special Class)	UEE42220Y Certificate IV in Instrumentation and Control	388	106	6
342315 Electronic Instrument Trades Worker (Special Class)	UEE43220Y Certificate IV in Industrial Automation and Control	273	41	3
341111 Electrician (General)	UEE50220Y Diploma of Electrical and Instrumentation	327	119	0
312412 Electronic Engineering Technician	UEE51020Y Diploma of Instrumentation and Control Engineering	8	2	3
312412 Electronic Engineering Technician	UEE60620Y Advanced Diploma of Industrial Electronics and Control Engineering	0	0	0

342315 Electronic Instrument Trades Worker (Special Class)	UEE40920Y Certificate IV in Industrial Electronics and Control	596	211	1
341113 Lift Mechanic	UEE41120Y Certificate IV in Electrical - Lift Systems	0	0	0
341112 Electrician (Special Class)	UEE50920Y Diploma of Industrial Electronics and Control Engineering	2	0	0
	UEEIC0001Y Analyse complex electronic circuits controlling fluids	2	2	3
	UEEIC0002Y Assemble, enter and verify operating instructions in microprocessor equipped devices	3199	2460	44
	UEEIC0003Y Assist in commissioning process and instrumentation control systems	8	8	10
	UEEIC0004Y Calibrate, adjust and test measuring instruments	1529	804	34
	UEEIC0005Y Configure and maintain industrial control system networks	839	568	18
	UEEIC0006Y Design and configure human-machine interface (HMI) networks	152	138	18
	UEEIC0007Y Design and use advanced programming tools, PC networks and HMI Interfacing	510	415	16
	UEEIC0008Y Design electronic control systems	5	0	12
	UEEIC0009Y Develop an electrical integrated system interface for access through a touch screen	23	21	12
	UEEIC0010Y Develop and test code for microcontroller devices	778	584	19

	UEEIC0011Y Develop electrical integrated systems	56	25	28
	UEEIC0012Y Develop structured programs to control external devices	6734	2631	31
	UEEIC0013Y Develop, enter and verify discrete control programs for programmable controllers	11279	7454	52
	UEEIC0014Y Develop, enter and verify programs in supervisory control and data acquisition systems	1242	965	20
	UEEIC0015Y Develop, enter and verify word and analogue control programs for programmable logic controllers	4542	2924	29
	UEEIC0016Y Diagnose and rectify faults in a.c. motor drive systems	92	88	10
	UEEIC0017Y Diagnose and rectify faults in d.c. motor drive systems	81	79	10
	UEEIC0018Y Diagnose and rectify faults in digital controls systems	1092	757	20
	UEEIC0019Y Diagnose and rectify faults in servo drive systems	0	0	10
	UEEIC0020Y Fault find and repair analogue circuits and components in electronic control systems	867	589	21
	UEEIC0021Y Find and rectify faults in process final control elements	2136	1204	22
	UEEIC0022Y Install instrumentation and control apparatus and associated equipment	2257	1290	24
	UEEIC0023Y Install instrumentation and control cabling and tubing	2220	1248	24

	UEEIC0024Y Plan the electrical installation of integrated systems	25	4	28
	UEEIC0025Y Provide solutions to extra-low voltage (ELV) electro-pneumatic control systems and drives	59	42	10
	UEEIC0026Y Provide solutions to fluid circuit operations	185	165	15
	UEEIC0027Y Provide solutions to pneumatic-hydraulic system operations	69	67	15
	UEEIC0028Y Provide solutions to problems in industrial control systems	230	194	15
	UEEIC0029Y Set up and adjust PID control loops	2359	1312	22
	UEEIC0030Y Set up and adjust advanced PID process control loops	2362	1326	22
	UEEIC0031Y Set up and configure human-machine interface (HMI) and industrial networks	2184	1255	22
	UEEIC0032Y Set up electronically controlled robotically operated complex systems	17	6	12
	UEEIC0033Y Set up gas analysis measuring and control instruments	326	271	19
	UEEIC0034Y Set up industrial field control devices	210	177	9
	UEEIC0035Y Set up scientific analysis measuring and control instruments	165	161	19
	UEEIC0036Y Set up water analysis measuring and control instruments	438	310	19

	UEEIC0037Y Set up weighting measuring and control instruments	227	200	19
	UEEIC0038Y Solve problems in density/level measurement components and systems	4276	2643	30
	UEEIC0039Y Solve problems in flow measurement components and systems	4218	2597	30
	UEEIC0040Y Solve problems in polyphase electronic power control circuits	86	74	9
	UEEIC0041Y Solve problems in pressure measurement components and systems	4419	2731	30
	UEEIC0042Y Solve problems in single phase electronic power control circuits	340	143	17
	UEEIC0043Y Solve problems in temperature measurement components and systems	4279	2620	30
	UEEIC0044Y Troubleshoot measuring and analysis systems	102	63	10
	UEEIC0045Y Troubleshoot medical equipment control systems	18	5	19
	UEEIC0046Y Troubleshoot process control systems	672	478	19
	UEEIC0047Y Use instrumentation drawings, specifications, standards and equipment manuals	4853	3012	47
	UEEIC0048Y Verify compliance and functionality of instrumentation and control installations	2235	1250	20
	UEEIC0049Y Manage instrumentation and control projects	3	3	0

	UEEIC0050Y Plan instrumentation and control projects	1	1	0

Attachment C: List of stakeholders that actively participated in the consultation process of the Case for Change

Active participation has included stakeholders from the following organisations across all states and territories within Australia:

- Industry Reference Committee (IRC) Representatives
- Technical Advisory Committees
- Employers (Non-IRC)
- Peak Industry Bodies
- Unions
- Regulators
- RTOs
- Other/Consultants

Attachment D: Issues Raised by Stakeholders during consultation on the development of the Case for Change

Stakeholder Type	Issues Raised	IRC's Response to Issues Raised
Industry Reference Committee (IRC) Representatives	NIL	NA
Peak Industry Bodies	NIL	NA
Employers (Non-IRC)	NIL	NA
Regulators	NIL	NA
Registered Training Organisations (RTOs)	NIL	NA
Training Boards/Other	NIL	NA
State and Territory Training Authorities (STAs)	NIL	NA
Unions	NIL	NA
Please add other categories as appropriate	NIL	NA

Attachment E: List of stakeholders to be contacted as part of the development of the Case for Endorsement

The Case for Endorsement development will involve contacting stakeholders from the following types of organisations across all states and territories within Australia:

- Industry Reference Committee (IRC) Representatives
- Employers (Non-IRC)
- Peak Industry Bodies
- Unions
- Regulators
- RTOs
- Other/Consultants