Continuing Education Registry

Electrical Courses Approved

February 26, 2025 – March 26, 2025

Associated Builders and Contractors of Utah
6hr CE/2hr Backflow Preventer Installation (S330/S410)/ NRG - Course #: 22997
Electrician Pro Hours: 4.0

Associated Builders and Contractors of Utah
6 Hr Contractor CE inc/1hr NRG Conserv - Course #: 22999
Electrician Pro Hours: 4.0

Denver Joint Electrical Apprenticeship and Training Committee
Significant Code Changes to the 2023 NEC-CML - Course #: 23011
Electrician Core Hours: 16.0

e-Hazard
High Voltage Qualified/ NFPA 70E - Course #: 23055
Electrician Core Hours: 4.0 Pro Hours: 4.

e-Hazard
Electrical Safety NFPA 70E - Course #: 23053
Electrician Core Hours: 8.0

Electrical-License-Renewal.com
2023 NEC Code Changes Update-16 hours (4hrs NFPA 70E) - Course #: 23041
Electrician Core Hours: 16.0

Home Builders Association of Utah
Blueprint for Communication - Course #: 23009
Electrician Pro Hours: 3.0

Home Builders Association of Utah
Project Management - Course #: 23031
Electrician Pro Hours: 6.0

Home Builders Association of Utah
Managing Risk - Course #: 23029
Electrician Pro Hours: 6.0

Home Builders Association of Utah
Energy Code-You Decide - Course #: 23015
Electrician Pro Hours: 1.0

Home Builders Association of Utah
Accounting Essentials - Course #: 20253
Electrician Pro Hours: 6.0

Imlah Electrical Consulting
Electrical Wiring Methods-Materials, Ch. 4 - Course #: 23005
Electrician Core Hours: 4.0

Imlah Electrical Consulting
2023 NEC Electrical Equip for General Use - Course #: 22985
Electrician Core Hours: 4.0

Imlah Electrical Consulting
Electrical Transformers - Course #: 22983
Electrician Core Hours: 4.0

Imlah Electrical Consulting
Emergency, Legally Req & Opt Electrical Systems - Course #: 22981
Electrician Core Hours: 4.0

Imlah Electrical Consulting
2023 Grounding & Bonding - Course #: 22979
Electrician Core Hours: 4.0

Imlah Electrical Consulting
2023 NEC Code Changes Ch. 4 to 7 - Course #: 22977
Electrician Core Hours: 4.0

Imlah Electrical Consulting
2023 NEC Code Changes Ch. 1 to 4 - Course #: 22975
Electrician Core Hours: 4.0

Imlah Electrical Consulting
Interconnected Power Systems - Course #: 22973
Electrician Core Hours: 4.0

JADE Learning
Risk Management for Electrical Construction Projects - Course #: 23001
Electrician Pro Hours: 4.0

University of Utah - Rocky Mountain Center for Occupational and Environmental Health
Lead Inspector/Risk Assessor - Course #: 23061
Electrician Pro Hours: 4.0

Workers Compensation Fund
Incident Investigation - Course #: 23021
Electrician Pro Hours: 1.5

Workers Compensation Fund
Effective Communication for Managers/Supervisors - Course #: 23025
Electrician Pro Hours: 1.5

Workers Compensation Fund
Accident Prevention - Course #: 23027
Electrician Pro Hours: 1.5

Continuing Education Registry

Plumbing Courses Approved

February 26, 2025 – March 26, 2025

Associated Builders and Contractors of Utah
6hr CE inc/ 3 hrs IMC Codes & Energy Codes - Course #: 22991
Plumber Core Hours: 3.0 Pro Hours: 3.0

Associated Builders and Contractors of Utah
6hr CE/2hr Backflow Preventer Installation (S330/S410)/ NRG - Course #: 22997
Plumber Core Hours: 3.0 Pro Hours: 3.0

Associated Builders and Contractors of Utah
6 Hr Contractor CE inc/1hr NRG Conserv - Course #: 22999
Plumber Core Hours: 1.0 Pro Hours: 3.0

Home Builders Association of Utah
Blueprint for Communication - Course #: 23009
Plumber Core Hours: 3.0

Home Builders Association of Utah
Project Management - Course #: 23031
Plumber Pro Hours: 6.0

Home Builders Association of Utah
Managing Risk - Course #: 23029
Plumber Pro Hours: 6.0

Home Builders Association of Utah
Energy Code-You Decide - Course #: 23015
Plumber Core Hours: 1.0

Utah Plumbing and Heating Contractors Association
Water Quality - How to Test & Resolve - Course #: 22971
Plumber Core Hours: 2.0

Utah Plumbing and Heating Contractors Association
IBC Code Review Series - Course #: 22969
Plumber Core Hours: 3.0

University of Utah - Rocky Mountain Center for Occupational and Environmental Health
Lead Inspector/Risk Assessor - Course #: 23061
Plumber Core Hours: 7.5

Workers Compensation Fund
Incident Investigation - Course #: 23021
Plumber Pro Hours: 1.5

Workers Compensation Fund
Effective Communication for Managers/Supervisors - Course #: 23025
Plumber Pro Hours: 1.5

Workers Compensation Fund
Accident Prevention - Course #: 23027
Plumber Pro Hours: 1.5

UT - Electrical Score Summary

03/26/24 - 03/26/25

Exam Name	Candidates	Pass	Fail	Pass %	Avg Score
UT - 4-way Light Switch	807	623	184	77	84
UT - Conduit Bending	717	508	209	70	72
UT - Motor Control	765	514	251	67	67
UT - Motor Control Residential	235	204	31	86	86
UT - Schematic Plan	741	646	95	87	87
UT - Torque Settings	691	659	32	95	98
UT - Transformer Termination	568	549	19	96	96
Utah Journeyman Electrician Code	1072	460	612	42	70
Utah Journeyman Electrician Theory	908	476	432	52	74
Utah Master Electrician Code	185	113	72	61	76
Utah Master Electrician Theory	158	111	47	70	78
Utah Residential Journeyman Electrician Code	356	156	200	43	70
Utah Residential Journeyman Electrician Theory	267	152	115	56	75
Utah Residential Master Electrician Code	64	50	14	78	79
Utah Residential Master Electrician Theory	66	45	21	68	78
Total:	**7600**	**5266**	**2334**	**69**	**79**

Exam: UT - 4-way Light Switch

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	25	80	25	86
COLLEGE OF EASTERN UTAH	6	100	6	100
DAVIS TECHNICAL COLLEGE	59	66	48	74
DIXIE TECHNICAL COLLEGE	38	84	34	92
IBEW - OTHER	7	85	7	86
IBEW- Utah Electrical Training Alliance	123	76	104	84
IEC EDUCATION OF UTAH	147	77	124	83
MOUNTAINLAND Tech College	99	82	89	89
OGDEN-WEBER TECHNICAL COLLEGE	47	80	38	84
OTHER	56	73	49	82
OUT-OF-STATE	23	73	21	83
SALT LAKE COMMUNITY COLLEGE	95	72	78	83
SOUTHWEST Tech College	15	73	12	77
UINTAH BASIN TECHNICAL COLLEGE	7	100	7	100
WECA	17	70	12	82

Exam: UT - Conduit Bending

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	31	77	28	77
COLLEGE OF EASTERN UTAH	6	83	6	76
DAVIS TECHNICAL COLLEGE	62	51	39	65
DIXIE TECHNICAL COLLEGE	20	90	19	80
IBEW - OTHER	8	87	8	89
IBEW- Utah Electrical Training Alliance	107	85	99	83
IEC EDUCATION OF UTAH	121	72	98	73
MOUNTAINLAND Tech College	80	76	66	76
OGDEN-WEBER TECHNICAL COLLEGE	51	58	37	63
OTHER	50	66	38	69
OUT-OF-STATE	20	60	18	61
SALT LAKE COMMUNITY COLLEGE	79	58	61	64
SOUTHWEST Tech College	12	66	9	73
UINTAH BASIN TECHNICAL COLLEGE	8	100	8	89
WECA	17	76	13	75

Exam: UT - Motor Control

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	34	61	29	62
COLLEGE OF EASTERN UTAH	7	85	6	86
DAVIS TECHNICAL COLLEGE	61	57	41	57
DIXIE TECHNICAL COLLEGE	25	72	19	72
IBEW - OTHER	7	71	6	71
IBEW- Utah Electrical Training Alliance	106	89	99	90
IEC EDUCATION OF UTAH	137	67	106	69
MOUNTAINLAND Tech College	76	78	66	79
OGDEN-WEBER TECHNICAL COLLEGE	54	59	37	59
OTHER	63	55	44	56
OUT-OF-STATE	30	43	19	43
SALT LAKE COMMUNITY COLLEGE	79	54	59	54
SOUTHWEST Tech College	12	58	9	58
UINTAH BASIN TECHNICAL COLLEGE	14	42	8	43
Utah Home Builders Association (HBA)	1	100	1	100
WECA	16	87	14	88

Exam: UT - Motor Control Residential

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	3	66	2	67
DAVIS TECHNICAL COLLEGE	21	71	18	71
DIXIE TECHNICAL COLLEGE	27	92	26	93
IBEW- Utah Electrical Training Alliance	2	100	2	100
IEC EDUCATION OF UTAH	57	89	52	89
MOUNTAINLAND Tech College	49	91	47	92
OGDEN-WEBER TECHNICAL COLLEGE	7	100	7	100
OTHER	17	82	14	82
OUT-OF-STATE	1	100	1	100
SALT LAKE COMMUNITY COLLEGE	34	85	29	85
SOUTHWEST Tech College	7	85	6	86
WECA	2	50	1	50

Exam: UT - Schematic Plan

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	24	91	24	92
COLLEGE OF EASTERN UTAH	5	100	5	100
DAVIS TECHNICAL COLLEGE	49	87	48	88
DIXIE TECHNICAL COLLEGE	34	97	33	97
IBEW - OTHER	6	100	6	100
IBEW- Utah Electrical Training Alliance	108	90	101	91
IEC EDUCATION OF UTAH	136	88	125	88
MOUNTAINLAND Tech College	95	90	89	91
OGDEN-WEBER TECHNICAL COLLEGE	43	86	38	86
OTHER	47	82	43	83
OUT-OF-STATE	24	62	20	63
SALT LAKE COMMUNITY COLLEGE	85	80	74	80
SOUTHWEST Tech College	20	70	14	70
UINTAH BASIN TECHNICAL COLLEGE	7	100	7	100
WECA	12	100	12	100

Exam: UT - Torque Settings

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	24	100	24	99
COLLEGE OF EASTERN UTAH	4	100	4	100
DAVIS TECHNICAL COLLEGE	49	95	48	98
DIXIE TECHNICAL COLLEGE	34	100	34	100
IBEW - OTHER	6	100	6	100
IBEW- Utah Electrical Training Alliance	102	96	99	99
IEC EDUCATION OF UTAH	126	96	122	99
MOUNTAINLAND Tech College	90	95	88	98
OGDEN-WEBER TECHNICAL COLLEGE	42	90	39	97
OTHER	40	92	39	97
OUT-OF-STATE	21	85	20	96
SALT LAKE COMMUNITY COLLEGE	78	94	76	98
SOUTHWEST Tech College	12	100	12	100
UINTAH BASIN TECHNICAL COLLEGE	7	100	7	100
WECA	13	92	12	98

Exam: UT - Transformer Termination

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	30	93	28	95
COLLEGE OF EASTERN UTAH	5	100	5	98
DAVIS TECHNICAL COLLEGE	36	100	36	98
DIXIE TECHNICAL COLLEGE	19	100	19	99
IBEW - OTHER	6	100	6	100
IBEW- Utah Electrical Training Alliance	97	98	96	97
IEC EDUCATION OF UTAH	93	96	91	96
MOUNTAINLAND Tech College	58	98	58	97
OGDEN-WEBER TECHNICAL COLLEGE	38	92	35	93
OTHER	35	91	34	92
OUT-OF-STATE	20	90	19	92
SALT LAKE COMMUNITY COLLEGE	58	96	57	97
SOUTHWEST Tech College	11	81	9	84
UINTAH BASIN TECHNICAL COLLEGE	8	100	8	98
WECA	13	100	13	99

Exam: Utah Journeyman Electrician Code

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	49	51	40	73
COLLEGE OF EASTERN UTAH	9	44	6	70
DAVIS TECHNICAL COLLEGE	91	37	61	70
DIXIE TECHNICAL COLLEGE	48	33	35	69
IBEW - OTHER	5	20	4	69
IBEW- Utah Electrical Training Alliance	178	56	127	75
IEC EDUCATION OF UTAH	203	39	132	71
MOUNTAINLAND Tech College	132	45	92	71
OGDEN-WEBER TECHNICAL COLLEGE	79	46	54	72
OTHER	61	37	49	69
OUT-OF-STATE	21	19	16	61
SALT LAKE COMMUNITY COLLEGE	144	34	88	68
SOUTHWEST Tech College	20	30	15	68
UINTAH BASIN TECHNICAL COLLEGE	12	41	10	70
WECA	17	88	16	83

Exam: Utah Journeyman Electrician Theory

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	55	56	43	75
COLLEGE OF EASTERN UTAH	12	41	8	74
DAVIS TECHNICAL COLLEGE	72	47	47	72
DIXIE TECHNICAL COLLEGE	38	42	27	71
IBEW - OTHER	5	40	5	66
IBEW- Utah Electrical Training Alliance	156	68	126	79
IEC EDUCATION OF UTAH	167	51	114	74
MOUNTAINLAND Tech College	121	49	89	74
OGDEN-WEBER TECHNICAL COLLEGE	54	64	42	79
OTHER	46	36	39	69
OUT-OF-STATE	21	23	14	66
SALT LAKE COMMUNITY COLLEGE	113	46	77	72
SOUTHWEST Tech College	16	43	10	66
UINTAH BASIN TECHNICAL COLLEGE	11	45	8	74
WECA	21	61	14	77

Exam: Utah Master Electrician Code

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	8	50	6	74
COLLEGE OF EASTERN UTAH	1	0	1	68
DAVIS TECHNICAL COLLEGE	13	61	9	76
DIXIE TECHNICAL COLLEGE	6	50	4	75
IBEW - OTHER	10	70	8	78
IBEW- Utah Electrical Training Alliance	20	80	17	82
IEC EDUCATION OF UTAH	13	61	11	78
MOUNTAINLAND Tech College	8	75	8	77
OGDEN-WEBER TECHNICAL COLLEGE	21	76	20	80
OTHER	19	47	15	74
OUT-OF-STATE	5	80	5	81
SALT LAKE COMMUNITY COLLEGE	52	51	37	72
SNOW COLLEGE	2	50	1	80
SOUTHWEST Tech College	5	40	3	73
UINTAH BASIN TECHNICAL COLLEGE	3	100	3	83

Exam: Utah Master Electrician Theory

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	6	50	5	77
COLLEGE OF EASTERN UTAH	1	100	1	76
DAVIS TECHNICAL COLLEGE	7	71	7	76
DIXIE TECHNICAL COLLEGE	5	80	4	80
IBEW - OTHER	14	64	10	78
IBEW- Utah Electrical Training Alliance	19	84	17	83
IEC EDUCATION OF UTAH	10	80	9	81
MOUNTAINLAND Tech College	8	75	7	80
OGDEN-WEBER TECHNICAL COLLEGE	17	82	16	81
OTHER	15	53	13	79
OUT-OF-STATE	4	50	4	66
SALT LAKE COMMUNITY COLLEGE	41	65	32	74
SNOW COLLEGE	2	50	1	79
SOUTHWEST Tech College	5	60	3	74
UINTAH BASIN TECHNICAL COLLEGE	3	100	3	88

Exam: Utah Residential Journeyman Electrician Code

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	5	60	4	75
COLLEGE OF EASTERN UTAH	1	100	1	84
DAVIS TECHNICAL COLLEGE	25	28	17	64
DIXIE TECHNICAL COLLEGE	39	56	29	73
IBEW- Utah Electrical Training Alliance	2	50	2	71
IEC EDUCATION OF UTAH	87	44	56	71
MOUNTAINLAND Tech College	88	51	64	72
OGDEN-WEBER TECHNICAL COLLEGE	9	55	7	74
OTHER	32	25	20	66
OUT-OF-STATE	4	50	3	75
SALT LAKE COMMUNITY COLLEGE	51	35	38	69
SOUTHWEST Tech College	11	27	5	64
WECA	2	100	2	81

Exam: Utah Residential Journeyman Electrician Theory

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	3	66	2	79
COLLEGE OF EASTERN UTAH	2	50	2	73
DAVIS TECHNICAL COLLEGE	24	45	18	70
DIXIE TECHNICAL COLLEGE	27	74	24	82
IBEW- Utah Electrical Training Alliance	2	50	2	74
IEC EDUCATION OF UTAH	64	67	53	79
MOUNTAINLAND Tech College	71	56	53	76
OGDEN-WEBER TECHNICAL COLLEGE	10	50	7	74
OTHER	8	37	6	65
OUT-OF-STATE	4	50	3	70
SALT LAKE COMMUNITY COLLEGE	40	47	26	72
SOUTHWEST Tech College	10	30	7	70
WECA	3	66	2	85

Exam: Utah Residential Master Electrician Code

School	# Exams Given	Pass %	# Candidates	Avg Score
DAVIS TECHNICAL COLLEGE	2	100	2	88
DIXIE TECHNICAL COLLEGE	5	80	5	76
IBEW - OTHER	1	100	1	79
IEC EDUCATION OF UTAH	12	75	11	77
MOUNTAINLAND Tech College	16	87	15	82
OGDEN-WEBER TECHNICAL COLLEGE	4	100	4	90
OTHER	10	50	8	77
OUT-OF-STATE	3	33	2	69
SALT LAKE COMMUNITY COLLEGE	7	100	7	86
SOUTHWEST Tech College	3	66	3	73
UINTAH BASIN TECHNICAL COLLEGE	1	100	1	79

Exam: Utah Residential Master Electrician Theory

School	# Exams Given	Pass %	# Candidates	Avg Score
DAVIS TECHNICAL COLLEGE	2	100	2	85
DIXIE TECHNICAL COLLEGE	4	50	4	74
IBEW - OTHER	1	100	1	80
IEC EDUCATION OF UTAH	12	58	10	78
MOUNTAINLAND Tech College	20	80	17	82
OGDEN-WEBER TECHNICAL COLLEGE	4	100	4	87
OTHER	11	45	8	72
SALT LAKE COMMUNITY COLLEGE	8	75	7	79
SOUTHWEST Tech College	3	66	3	80
UINTAH BASIN TECHNICAL COLLEGE	1	0	1	68

UT - Plumbing Score Summary

03/26/24 - 03/26/25

Exam Name	Candidates	Pass	Fail	Pass %	Avg Score
Utah Master Plumber Law and Rule	226	77	149	34	67
Utah Plumber Practical	506	286	220	56	67
Utah Plumbing Theory	423	270	153	63	71
Utah Residential Plumbing Theory	64	43	21	67	71
Total:	**1219**	**676**	**543**	**55**	**69**

Exam: Utah Master Plumber Law and Rule

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	2	50	1	70
COLLEGE OF EASTERN UTAH	1	0	1	70
DAVIS TECHNICAL COLLEGE	16	31	9	68
DIXIE STATE COLLEGE	1	100	1	85
DIXIE TECHNICAL COLLEGE	26	26	12	67
MOUNTAINLAND Tech College	27	29	14	68
OGDEN-WEBER TECHNICAL COLLEGE	11	36	8	68
OTHER	80	38	52	69
SALT LAKE COMMUNITY COLLEGE	52	30	28	66
SOUTHWEST Tech College	9	44	4	73

Exam: Utah Plumber Practical

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	13	61	10	68
DAVIS TECHNICAL COLLEGE	49	48	39	65
DIXIE TECHNICAL COLLEGE	45	64	36	74
MOUNTAINLAND Tech College	86	61	71	71
OGDEN-WEBER TECHNICAL COLLEGE	44	56	34	69
OTHER	51	52	37	62
SALT LAKE COMMUNITY COLLEGE	191	53	136	67
SNOW COLLEGE	1	100	1	72
SOUTHWEST Tech College	7	42	5	54
UPHCA Apprenticeship Academy	3	100	3	86
Utah Home Builders Association (HBA)	1	100	1	78

Exam: Utah Plumbing Theory

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	17	82	14	74
DAVIS TECHNICAL COLLEGE	42	76	37	75
DIXIE TECHNICAL COLLEGE	44	77	40	74
MOUNTAINLAND Tech College	59	71	48	74
OGDEN-WEBER TECHNICAL COLLEGE	49	59	33	72
OTHER	42	26	26	61
SALT LAKE COMMUNITY COLLEGE	146	65	113	72
SOUTHWEST Tech College	12	41	8	71
UPHCA Apprenticeship Academy	8	62	6	73
UTAH VALLEY STATE COLLEGE	2	0	2	52

Exam: Utah Residential Journeyman Plumber Theory

School	# Exams Given	Pass %	# Candidates	Avg Score
BRIDGERLAND TECHNICAL COLLEGE	8	75	7	76
DAVIS TECHNICAL COLLEGE	5	60	5	67
DIXIE TECHNICAL COLLEGE	9	77	8	75
MOUNTAINLAND Tech College	16	75	13	75
OGDEN-WEBER TECHNICAL COLLEGE	1	100	1	73
OTHER	9	33	6	60
SALT LAKE COMMUNITY COLLEGE	16	68	15	73

***Condensed version

REPORT: ANALYSIS OF APPRENTICE PLUMBER THEORY EXAMINATION

RETAKE RATES FOLLOWING 2016 RULE CHANGE

Executive Summary:

This report examines the impact of the 2016 rule change, which permitted apprentice plumbers to sit for the theory examination upon completion of 4A, on the average number of examination retakes. Contrary to the anticipated outcome of enhanced student success, the data reveals a significant increase in retake rates post-implementation. This analysis concludes that the rule change has not achieved its intended objective and, in fact, has resulted in a demonstrably higher probability of examination failure.

1. Introduction:

In 2016, a rule change was implemented allowing apprentice plumbers to take the theory examination upon completion of the 4A coursework. The rationale provided for this change was that earlier examination attempts, while the material was still fresh, would improve student pass rates. This report analyzes the historical data on examination retake rates to evaluate the effectiveness of this rule change.

2. Data Analysis:

2.1 Pre-Amendment Examination Retake Rates (October 2016):

- Prior to the 2016 rule change, the average number of *examination attempts per candidate was 1.19*. This figure represents the baseline for pre-amendment performance.

2.2 Post-Amendment Examination Retake Rates (October 2017):

- Following the implementation of the rule change, the average number of *examination attempts per candidate increased to 1.26*.
- This represents *a 5.8% increase in retake rates within the first full year following the change*.
- The raw retake count in *October of 2016 was 1.21, and the raw retake count for October of 2017 was 1.37, representing a 13.22% increase in raw retake counts.*

2.3 Long-Term Post-Amendment Examination Retake Rates (2017-2025):

- The average number of *examination attempts per candidate from 2017 to 2025 is 1.47*.
- This represents *a 21.49% increase in retake rates when compared to the pre-amendment average*.
- This data indicates *a sustained and significant increase in retake rates over the nine years since the rule change.*

3. Findings and Discussion:

The data analysis **contradicts the stated rationale for the 2016 rule change**. The anticipated improvement in student pass rates due to earlier examination attempts **has not materialized**. Instead, the data demonstrates:

- *A statistically significant increase in the average number of examination attempts per candidate* post-amendment.
- ***A higher probability of failure for candidates testing earlier***.
- The raw retake counts *have increased significantly*.
- The long-term average retake rates *confirm the sustained negative impact of the rule change*.

The assertion that "allowing students to take the exam sooner, while the material was still fresh, would enhance their likelihood of success" *is not supported by the empirical data*.

4. Conclusion and Recommendations:

Based on the evidence presented, the 2016 rule change *has failed to achieve its intended objective and has resulted in a demonstrable increase in examination retake rates. This indicates that earlier testing* ***does not confer any advantage to students.***

Recommendations:

- Re-evaluate the 2016 rule change and consider *reverting to the pre-amendment examination eligibility criteria.*
- Implement targeted interventions and support programs to improve student preparedness for the theory examination.
- Track retake rates of students who test under the old rule, and compare those rates to the retake rates of students who tested under the new rule, to further determine the impact of the rule change.
- Further review the 4A course, to ensure that it is adequately preparing students for the examination.

This report underscores the importance of data-driven decision-making in policy implementation and the need for ongoing evaluation to ensure the effectiveness of educational initiatives.

**Complete Detailed report

SUPPORTING POST-EDUCATION THEORY EXAMINATION FOR APPRENTICE PLUMBERS

1. Executive Summary:

This report addresses the impact of a 2016 rule change that permitted apprentice plumbers to undertake the theory examination upon completion of the 4A coursework. Analysis of examination retake rates, as detailed in the "Analysis of Apprentice Plumber Theory Examination" report, reveals a significant increase in failures following this policy shift. This outcome contradicts the initial expectation that earlier testing would enhance student success. The data presented in that report concludes that the rule change has not met its intended objective and has demonstrably increased the likelihood of examination failure. Further review of existing research on examination timing in vocational trades and the typical structure of apprentice plumber education programs reinforces the position that a comprehensive educational foundation should precede the theory examination. Based on the evidence, this report recommends a re-evaluation of the 2016 rule change and a

strong consideration of reverting to a policy that requires completion of the full educational program before an apprentice is eligible to sit for the theory examination.

2. Introduction:

In the realm of vocational education, particularly within skilled trades such as plumbing, the integrity and effectiveness of assessment practices are paramount. Competency in plumbing directly affects public safety and health, making rigorous evaluation of an apprentice's theoretical understanding essential before they are granted licensure. In this context, a 2016 rule change allowed apprentice plumbers to take the theory examination after completing only the 4A coursework. The rationale for this change, as outlined in the "Analysis of Apprentice Plumber Theory Examination" report, was the belief that earlier examination attempts, while the material was still considered fresh in the apprentice's mind, would lead to improved pass rates. However, the subsequent analysis of examination data paints a different picture. This report focuses on the findings of the aforementioned analysis, supplemented by broader research into examination timing within vocational fields and the structure of plumbing apprenticeship programs, to build a comprehensive argument supporting the position that apprentice plumbers should be required to complete their full education before being eligible to undertake the theory examination.

3. Detailed Review of the "Analysis of Apprentice Plumber Theory Examination" Report:

The "Analysis of Apprentice Plumber Theory Examination" report provides a valuable data-driven perspective on the impact of the 2016 rule change. The methodology employed in the report centers on the analysis of historical data concerning examination retake rates, comparing performance metrics before and after the implementation of the revised policy.

The key findings of the report clearly illustrate a negative consequence of the rule change. Prior to October 2016, before the amendment took effect, the average number of examination attempts per candidate stood at 1.19. This figure served as the baseline for evaluating the impact of the new rule. Following the implementation of the change, by October 2017, the average number of examination attempts per candidate had increased to 1.26. This represented a 5.8% increase in retake rates within the first full year after the policy was enacted. Furthermore, the raw retake count also saw a significant rise, from 1.21 in October 2016 to 1.37 in October 2017, indicating a 13.22% increase in the raw number of retakes.

The long-term data further solidified these initial observations. Over the nine-year period from 2017 to 2025, the average number of examination attempts per candidate reached 1.47. This figure represents a substantial 21.49% increase in retake rates when compared to the pre-amendment average. This sustained increase over a significant period strongly suggests that the policy change has had a lasting and detrimental effect on examination outcomes.

Based on this data analysis, the report draws several critical conclusions. The most significant is that the data directly contradicts the initial rationale behind the 2016 rule change. The anticipated improvement in student pass rates due to earlier examination attempts simply did not materialize. Instead, the evidence points to a statistically significant increase in the average number of examination attempts per candidate after the amendment. This increase indicates a higher probability of failure for candidates attempting the examination earlier in their apprenticeship. The rise in raw retake counts further supports this conclusion, as does the long-term average of retake rates, which confirms the sustained negative impact of the rule change. The report

explicitly states that the assertion that allowing students to test sooner would enhance their likelihood of success **is not** supported by the empirical data.

The report offers several pertinent recommendations in light of these findings. Primarily, it suggests a re-evaluation of the 2016 rule change, with consideration given to reverting to the pre-amendment examination eligibility criteria. Additionally, the report recommends conducting further research to delve into the underlying factors contributing to the observed increase in retake rates. Implementing targeted interventions and support programs to improve student preparedness for the theory examination is also advised. Finally, the report suggests tracking retake rates under both the old and new rules, if a reversion occurs, to further assess the impact of the policy change, and to review the 4A course content to ensure its adequacy in preparing students for the examination.

The consistent and significant increase in retake rates observed over nearly a decade following the 2016 rule change indicates a fundamental issue with the policy of allowing theory examination after only the 4A coursework. This is not a temporary fluctuation in performance but a sustained trend directly linked to the change in eligibility. This pattern strongly implies that the knowledge and skills acquired by completing the 4A coursework alone are insufficient for a significant number of apprentices to successfully pass the theory examination. The fact that retake rates rose immediately after the rule change and remained elevated suggests a direct causal relationship between earlier testing and a higher likelihood of failure.

Furthermore, the increased number of retake attempts signifies a potential inefficiency within the apprenticeship program. Each failed attempt not only represents a setback and potential cost for the apprentice but also consumes resources from the administering body in terms of scheduling, administering, and grading additional examinations. This inefficiency can detract from the overall effectiveness of the program and potentially delay the entry of qualified plumbers into the workforce. The higher probability of failure also raises questions about the preparedness of apprentices entering the examination room after only a portion of their education, suggesting a mismatch between the scope of the 4A curriculum and the breadth of knowledge assessed by the theory examination.

4. Analysis of Existing Research on Examination Timing in Vocational Trades:

Research from other vocational fields offers valuable insights into the relationship between examination timing and pass rates. A study on nursing licensure exams found a significant inverse relationship between lag time (the period between becoming eligible to test and actually taking the exam) and pass/fail status. This suggests that for nursing candidates, delaying the exam after they are deemed ready can decrease their chances of success. The study also noted an inverse relationship between the number of repeat attempts and pass/fail status, implying that with each subsequent attempt, the likelihood of passing diminishes. While this research focuses on nursing, it underscores the general principle that timely assessment after a period of learning is crucial for optimal outcomes. However, it's important to note that "eligibility" in the nursing context typically follows the completion of the nursing program, contrasting with the plumbing scenario where testing is permitted after only a portion of the curriculum.

Another study in health informatics presented mixed results regarding the impact of waiting time after a preparation course on passing certification exams. It did, however, highlight a moderate correlation between student performance on in-service exams and performance on board certification exams, as well as a significant correlation between student GPA and passing the certification exam. This suggests that overall academic

performance and mastery of the subject matter, often reflected in GPA, are important factors in predicting success on professional certification exams. This finding supports the idea that completing the full plumbing apprenticeship program, which would contribute to a more comprehensive understanding and likely a higher overall performance record, would better prepare apprentices for the theory examination.

Further research on the NCLEX (nursing licensure exam) echoes the findings of the previous nursing study, indicating that delays in completing examinations for professional programs can negatively affect exam scores. This study specifically recommends providing students with the opportunity to write the licensure examination as soon as possible after completion of their nursing program to maximize success, emphasizing the correlation between lag time and pass rates. This again highlights the importance of taking the exam relatively soon after the learning period concludes, which in the context of the plumbing apprenticeship, would mean after the completion of the entire educational program.

A broader perspective from a study on various licensing exams suggests that individuals who do not delay in taking the exam once eligible are more likely to pass. The key here is the concept of "eligibility." In the context of a comprehensive apprenticeship program, eligibility for the final theory examination should logically be tied to the completion of all required coursework and practical training, ensuring that the candidate has acquired the full spectrum of knowledge and skills necessary for the profession.

While some research points to the promising role of predictive ability measurement examinations in achieving higher first-time pass rates, this typically refers to assessments conducted *during* the educational program to identify areas where students may need additional support. It does not necessarily advocate for taking the final, high-stakes theory examination before the completion of the entire curriculum. Such predictive assessments could be valuable tools within the plumbing apprenticeship program to gauge readiness and provide targeted assistance, but they do not negate the importance of comprehensive preparation before the final examination.

The collective evidence from research in other vocational fields suggests that while timely examination after the completion of a program is generally beneficial, attempting a comprehensive theoretical assessment before the full educational foundation has been laid can be detrimental to success rates. The emphasis on taking exams after eligibility, often defined by program completion, reinforces the argument for administering the apprentice plumber theory examination only after all required coursework is finished.

5. The Importance of Comprehensive Curriculum Coverage Before Examination:

A typical plumbing apprenticeship program is structured to provide a comprehensive education over a period of approximately four years. This structured learning journey involves a progressive acquisition of knowledge and skills, moving from foundational concepts to more complex applications. Across various institutions and training programs, the curriculum generally covers a wide array of essential topics. These include basic math and geometry, which are crucial for calculations and measurements in plumbing work; a thorough understanding of plumbing codes and regulations at local and national levels, ensuring compliance and safety; the ability to read and interpret blueprints and technical drawings, essential for planning and executing plumbing installations; knowledge of different types of pipes and fittings, including plastic, copper, cast iron, and steel, and the appropriate joining methods for each; a detailed understanding of drain, waste, and vent (DWV) systems, vital for sanitation and preventing sewer gases; comprehensive knowledge of water supply and distribution systems, including sizing and protection; familiarity with various plumbing fixtures and appliances, and their installation requirements; understanding the principles and operation of water heaters and fuel gas systems; knowledge of

backflow prevention methods to protect potable water supplies; and an overview of storm drainage systems. Later stages of the apprenticeship often include more specialized topics such as potable water treatment and even business principles relevant to licensed plumbers.

Based on available information, the 4A coursework, completed relatively early in the apprenticeship, likely focuses on the foundational aspects of these broader topics. It probably includes an introduction to the plumbing profession, basic safety protocols, an overview of common plumbing tools, fundamental mathematical concepts relevant to plumbing, and an initial introduction to plumbing codes and drawings. Apprentices at this stage might also receive an introductory understanding of plastic and copper piping, basic fixtures and faucets, and a preliminary look at drain, waste, and vent (DWV) systems, as well as water distribution systems. For instance, one course description explicitly labels itself as "Introduction to Plumbing – 4", suggesting its introductory nature. Another lists topics such as "Plumbing History, Codes, and Principles," "Tools of the Plumbing Trade," "Basic Math for Plumbing," and "Introduction to DWV Systems" as part of its curriculum, all indicative of foundational knowledge.

Completing only the 4A coursework is likely to leave significant gaps in the critical knowledge areas required for a comprehensive theory examination designed to assess readiness for licensure. Apprentices at this stage may lack a deep understanding of advanced plumbing codes and their application in complex scenarios, a detailed knowledge of the nuances of different piping systems and their specific installation requirements, an in-depth grasp of venting principles and the associated sizing calculations, and a thorough understanding of water supply system design and protection against contamination. Specialized systems such as fuel gas, medical gas, or solar heating, which are often covered in the later years of a typical apprenticeship, would likely not be part of the 4A curriculum. Similarly, business principles relevant to the responsibilities of a licensed plumber are typically introduced in the final stages of training.

The structure of the apprenticeship curriculum is intentionally designed for a gradual and progressive build-up of knowledge and skills. Assessing an apprentice's theoretical understanding after only a fraction of this comprehensive training program is akin to evaluating a student's mastery of an entire subject after they have only completed the introductory chapters. The sequential nature of the curriculum ensures that more advanced concepts are built upon the foundational knowledge acquired in earlier stages. Attempting a comprehensive theory examination after completing only the initial 4A segment means that apprentices have likely not yet been exposed to, let alone mastered, a substantial portion of the theoretical knowledge deemed necessary for a competent and licensed plumber.

The increased retake rates observed following the 2016 rule change can be directly attributed to this premature testing. Apprentices are being evaluated on theoretical concepts and principles that they have not yet had the opportunity to learn in sufficient depth through their education. The curriculum is designed to provide a complete and well-rounded understanding of the plumbing trade over several years, and testing after only the initial phase of this education inevitably leads to a higher likelihood of failure due to incomplete knowledge.

To further illustrate the potential knowledge gaps, consider the following comparison of typical curriculum topics across different levels of a plumbing apprenticeship program:

Topic Area	Likely Covered in 4A Coursework	Covered in Full Apprenticeship Program
Basic Plumbing Math	Yes	Yes

Introduction to Plumbing Codes	Yes	Yes (in increasing detail)
Plumbing Safety	Yes	Yes
Basic Tools & Materials	Yes	Yes (with advanced tools/materials)
Introduction to DWV Systems	Yes	Yes (in-depth)
Water Supply Basics	Yes	Yes (in-depth)
Advanced Plumbing Codes	Likely No	Yes
Venting Principles & Sizing	Likely No	Yes
Fuel Gas Systems	Likely No	Yes
Backflow Prevention	Likely No	Yes
Commercial Plumbing	No	Yes
Business Principles	No	Yes (in later years)

Export to Sheets

This comparison highlights the significant difference in the breadth and depth of knowledge expected of a fully licensed plumber compared to what is likely covered in the introductory 4A coursework. Testing before exposure to these more advanced topics puts apprentices at a clear disadvantage.

6. Exploring the Reasons Behind Increased Retake Rates with Early Examination:

The observed increase in examination retake rates following the implementation of the rule allowing early testing likely stems from several interconnected factors. One significant reason is the insufficient time for knowledge consolidation and practical application. Taking the theory examination relatively early in the apprenticeship, after only the 4A coursework, may not provide apprentices with enough time to fully absorb and internalize the foundational knowledge they have been introduced to. The apprenticeship model is built upon the principle of integrating classroom learning with hands-on experience. Theoretical concepts often become more meaningful and are retained more effectively when they are applied in real-world plumbing scenarios over time. A focus on simply completing the initial coursework without the opportunity for substantial practical application could lead to a superficial understanding that is insufficient for a comprehensive theory examination.

Furthermore, experiencing failure on a high-stakes examination early in their career can have a negative psychological impact on apprentices. It can erode their motivation, undermine their confidence in their abilities, and potentially decrease their overall engagement with the apprenticeship program. While the provided report does not directly address dropout rates, it is plausible that repeated failures could contribute to attrition in the long term. The increased number of attempts required to pass the examination can lead to feelings of discouragement and inadequacy, potentially hindering an apprentice's progress and their perception of their suitability for the plumbing trade.

A crucial factor contributing to the higher retake rates is likely the mismatch between the content and scope of the theory examination and the relatively limited curriculum covered in the 4A coursework. As discussed in the previous section, the theory examination is probably designed to assess a broad range of knowledge encompassing all aspects of the plumbing trade, including topics that are typically taught in the later stages of the apprenticeship program. Expecting apprentices to demonstrate mastery of this comprehensive body of knowledge after completing only the introductory 4A coursework sets them up for failure.

Additionally, the development of problem-solving and critical thinking skills, which are essential for successfully navigating the theory examination, may not be fully realized after just the initial stages of the apprenticeship. The 4A coursework likely focuses on introducing basic concepts and procedures. The ability to apply these concepts to solve complex plumbing-related problems and to think critically about different scenarios is often honed over time as apprentices gain more practical experience and a more comprehensive theoretical understanding through the later stages of their education.

The timing of the examination appears to be creating a negative cycle. Instead of reinforcing learning, early failure might generate anxiety and a negative perception of the theoretical aspects of the trade. While testing can be a powerful tool for enhancing memory and learning when individuals are adequately prepared, attempting a high-stakes examination before a sufficient level of preparedness is achieved can lead to frustration and a feeling of being overwhelmed, potentially hindering future learning and exam performance.

It is also worth considering whether the 4A curriculum itself is optimally designed to lay the necessary groundwork for the broader theoretical knowledge required for the examination, regardless of when it is taken. While the immediate increase in retake rates after the rule change strongly suggests that the timing of the exam is the primary issue, a review of the 4A curriculum, as recommended in the initial report, could also identify areas for potential improvement in preparing apprentices for the theoretical challenges of the plumbing trade. However, the direct correlation between allowing testing after 4A and the subsequent surge in retakes indicates that the timing of the exam relative to the completion of the full educational program is the more immediate and impactful factor contributing to the increased failure rates.

7. The Synergistic Relationship Between Practical Experience and Theoretical Understanding:

In vocational trades like plumbing, theoretical knowledge and practical experience are intrinsically linked and mutually reinforcing. They are not separate entities but rather two sides of the same coin, both essential for developing a competent and skilled plumber. This integrated approach to learning is a cornerstone of the apprenticeship model.

Hands-on work in the field provides apprentices with the opportunity to see theoretical concepts in action, making them more concrete and easier to comprehend and remember. For example, when an apprentice learns about the principles of water pressure in the classroom, their understanding is deepened when they experience and troubleshoot pressure issues on a job site. Similarly, the theoretical knowledge of plumbing codes becomes more relevant and understandable when an apprentice is tasked with installing piping according to those codes. Practical tasks such as installing different types of piping, diagnosing and resolving drainage problems, or fitting various fixtures serve to solidify the theoretical knowledge acquired through coursework. The act of physically performing these tasks reinforces the underlying principles and builds a more robust understanding.

Conversely, a solid theoretical foundation is crucial for apprentices to perform their practical work effectively. Understanding the "why" behind plumbing procedures, as explained by theory, allows apprentices to make

informed decisions, troubleshoot problems more efficiently, and adapt to different situations they encounter in the field. For instance, knowing the theory behind venting systems enables an apprentice to understand the importance of proper installation and to identify potential issues that might arise. A strong grasp of plumbing codes ensures that their practical work is compliant with regulations, promoting safety and quality. Theoretical knowledge empowers apprentices to move beyond simply following instructions and to develop a deeper understanding of the plumbing systems they are working on.

Delaying the theory examination until after the completion of the full educational program allows apprentices to accumulate a significant amount of practical experience alongside their theoretical learning. Over the course of a four-year apprenticeship, apprentices spend thousands of hours working under the supervision of experienced plumbers, applying the knowledge they gain in the classroom to real-world situations. This integration of theoretical knowledge and practical experience leads to a more profound and lasting understanding of the plumbing trade. By the time they are ready to take the theory examination, they have had the opportunity to contextualize their classroom learning through extensive hands-on application, making the theoretical concepts more meaningful and accessible.

Allowing the theory examination only after the completion of the full education aligns with the natural progression of learning inherent in an apprenticeship. Practical skills and theoretical knowledge are developed concurrently over time, each informing and enriching the other. This integrated approach ensures that apprentices are not just memorizing facts for an exam but are developing a holistic understanding of the plumbing trade.

Testing prematurely, after only the 4A coursework, disrupts this natural learning progression. It assesses theoretical knowledge in isolation, before it has been fully contextualized and reinforced by substantial practical experience. By testing before apprentices have had the opportunity to apply a significant portion of their theoretical learning in a practical setting, the program is essentially evaluating their understanding in a vacuum. This disconnect between theoretical assessment and practical application likely contributes significantly to the increased failure rates observed after the 2016 rule change.

8. Review of Best Practices and Expert Opinions on Examination Timing:

An examination of best practices in apprentice education and the opinions of experts in the field further supports the position of administering the theory examination after the completion of the full educational program. Generally, apprenticeship programs are structured as comprehensive training experiences that combine on-the-job training with related classroom instruction over a period of several years. The typical duration of a plumbing apprenticeship is around four to five years, involving thousands of hours of practical work and hundreds of hours of classroom learning. This structure suggests that the culmination of this extensive training, rather than an assessment after only a fraction of it, is the appropriate time for a comprehensive theory examination. In some instances, the scheduling of technical training is a collaborative effort between the employer and the apprentice, allowing for flexibility based on the apprentice's readiness. However, the overall framework emphasizes a complete period of learning before final assessment. Some apprenticeship models explicitly state that assessment occurs at the end of the program.

Expert opinions from within the plumbing industry and vocational training specialists also lean towards the importance of completing the full educational journey before undertaking significant examinations. Resources aimed at plumbing apprentices emphasize the need to keep up with coursework, highlighting that theoretical

knowledge directly supports the development of practical skills and is crucial for exam preparation. It is generally understood that the knowledge gained through coursework provides the foundation for understanding the reasoning behind practical tasks. Advice for aspiring plumbers often suggests preparing for licensing exams towards the later stages of their apprenticeship, with some even recommending taking mock exams in the third or fourth year. This implies that the official licensing examination, which includes a theory component, is best approached after a substantial portion of the apprenticeship, if not its entirety, has been completed. Many in the field believe that plumbers are typically ready for their licensing exams within a few months *after completing* their apprenticeship, indicating that the full period of training is considered a prerequisite for exam readiness. In fact, the fourth or fifth year of an apprenticeship is often when apprentices begin to focus on preparing for their certification exams, which may include both written and practical components.

While specific policies regarding the timing of theory examinations might vary across different jurisdictions and organizations, the general trend in apprentice education, as indicated by the available information, is to have a comprehensive period of learning that integrates theoretical knowledge and practical experience, followed by a final assessment to determine competency. The 2016 rule change allowing theory examination after only the 4A coursework appears to deviate from this established best practice by assessing theoretical understanding prematurely, before apprentices have had the opportunity to benefit from the full scope of their education and practical training. The lack of readily available examples in the provided snippets of other jurisdictions or organizations implementing similar policies of early theory examination in plumbing apprenticeships further suggests that the pre-2016 policy of post-education examination might be more aligned with standard and effective practices in vocational training.

9. Recommendations for Policy and Practice:

Based on the compelling evidence presented in the "Analysis of Apprentice Plumber Theory Examination" report, the insights gleaned from research in other vocational fields, the critical importance of comprehensive curriculum coverage, the likely reasons behind the increased retake rates associated with early examination, the synergistic relationship between practical experience and theoretical understanding, and the general best practices observed in apprentice education, the following recommendations are put forth:

The primary and most strongly supported recommendation is to **revert to the pre-amendment examination eligibility criteria**, which required apprentice plumbers to complete their full educational program before being eligible to sit for the theory examination. The data clearly demonstrates that allowing testing after only the 4A coursework has led to a significant and sustained increase in examination retake rates, undermining the intended goal of improved student success.

In addition to this primary recommendation, it is advisable to **conduct a thorough review of the 4A course content**. While the timing of the exam appears to be a critical factor, the initial report also suggests examining the 4A curriculum to ensure it provides an adequate foundation for the subsequent stages of learning. This review should assess the learning objectives, content, and assessment methods of the 4A coursework to identify any areas where improvements could be made to better prepare apprentices for the theoretical aspects of the trade.

To enhance the overall effectiveness of the apprenticeship program and better prepare apprentices for the final theory examination, consideration should be given to **implementing formative assessments throughout the apprenticeship**. These could include more frequent, low-stakes assessments conducted at various stages,

including after the 4A coursework, to gauge student understanding and identify areas where additional support might be needed. Such assessments can provide valuable feedback to both the apprentices and the instructors, allowing for timely interventions and adjustments to learning strategies without the negative consequences associated with early high-stakes testing.

For apprentices who may encounter difficulties with the theoretical aspects of the trade, it is recommended to **provide targeted support programs**. These could include tutoring services, study groups facilitated by experienced plumbers or instructors, or access to additional learning resources. Offering such support, particularly in the period leading up to the final theory examination after the completion of their education, can help improve preparedness and increase the likelihood of success.

To further evaluate the impact of the examination timing policy, it is crucial to **track and compare retake rates under different policies**. If the policy is reverted to requiring post-education examination, it will be essential to collect data on retake rates under this new (or rather, old) system and compare it to the data collected under the 2016 rule change. This longitudinal data will provide further empirical evidence to definitively assess the effectiveness of different examination timing policies.

Finally, as a longer-term consideration, it might be beneficial to **explore a two-part examination structure**. This could involve a foundational theory section that could potentially be taken after a more substantial portion of the curriculum has been completed (perhaps after the second year or a designated set of core courses), followed by a comprehensive final theory examination after the completion of the entire educational program. This approach could allow for an assessment of knowledge progression while still ensuring a thorough and comprehensive understanding of plumbing theory before full licensure is granted.

10. Conclusion:

The evidence overwhelmingly supports the position of waiting to administer the apprentice plumber theory examination until after apprentices have completed their full educational journey. The data from the "Analysis of Apprentice Plumber Theory Examination" report clearly indicates that the 2016 rule change, which permitted earlier testing, has resulted in a significant and sustained increase in examination retake rates, failing to achieve its intended objective of enhancing student success. A comprehensive understanding of plumbing theory, essential for ensuring competency and public safety, is best achieved through the completion of the entire apprenticeship education program. This allows for the progressive development of knowledge, the integration of theoretical concepts with practical experience, and the maturation of problem-solving and critical thinking skills. Aligning the timing of the theory examination with the completion of the educational program is a more effective approach to ensure apprentice success, maintain high standards within the plumbing profession, and avoid the inefficiencies and potential discouragement associated with increased examination retakes. The weight of the evidence strongly suggests that reverting to a policy of post-education theory examination is the most appropriate course of action.

March 26, 2025

To the Utah State Electricians and Plumbers Licensing Board,

My name is Thomas Hicken. I am a plumber and an apprenticeship instructor. I have been teaching plumbing apprenticeship since 2008 and spent 4 years as the Department Head of Apprenticeship at Bridgerland Technical College from 2020 to 2024. I was directly involved with the USHE mandated curriculum alignment of plumbing education in 2021 and 2022. In 2024, I was hired by Utah State University Eastern to create a plumbing apprenticeship program in Price to service the central and southeast regions of the State, including Moab and Blanding. I have a deep passion for plumbing education, and a long understanding of apprenticeship, having been involved for several decades.

I want to express my appreciation to you for the important service that you provide. As a plumber I know that the testing and licensing requirements serve to protect the health and safety of our communities, and to maintain plumbing as a valued profession. I have seen the results of poor plumbing craftsmanship many times, and I know the importance of ensuring that plumbers are qualified to perform their essential work.

I was not able to attend the meeting on March 5th, but I have listened with great interest to the recording of the meeting. The discussion about plumbers testing in their fourth year was of particular interest to me, and I wish to express my views on the subject.

Having taught plumbing apprenticeship classes for almost two decades, I have seen a great change in the programs, the students and the successes of our graduating students. For many years we struggled with the same problem mentioned by one of the members in the last meeting who stated that they are having trouble getting electrician students to go take their tests. This was my experience with plumbing students for many years.

When the Plumbing Licensing Board authorized plumbers to take their tests during 4B to expedite the licensing process, I saw an enormous change in our students. There was a surge of enthusiasm and energy to take the test earlier. This led to much higher levels of completion and more students achieving their journeyman license upon completion of our plumbing program. At Bridgerland, we saw our 4th year students who achieved journeyman go from around 50% to over 90%.

This surge of success was partly fueled by the fact that our students were provided with a passing grade for 4B once they passed their state tests and at that point attendance became optional. As was expressed many of my colleagues during the meeting on March

5th, including Dave Hill, Dave James, and Mark Lund this was commonly understood among the plumbing educators and known to the plumbing board, though it was not acknowledged in writing. It was not done in secret, nor was it done with any intent to cheat or bend rules. As educators, our entire focus was on the success of our students as they progress in their careers. We have witnessed the positive effect of this motivation as our previously passive students have actively engaged with the hope of passing a test sooner rather than later.

Regarding the competency test for Plumber 4B, the fact is, that the state plumber written exam has stood in place of the final competency test for Plumber 4B for as long as I have ever been involved in plumbing education. In substitute for a written exam, the final that I administered was a graded practical project. However, once our 4th year students had passed both the written and practical tests, those students had effectively passed the class and were awarded accordingly. At the time, my understanding was that providing credit for students for completion of any semester fell under the jurisdiction of the educational institution. The state licensing board does not dictate exactly what is taught, or how it is taught or how an institution awards credit for classes taken. Further consider, what would be the purpose of forcing a competency test at 4B level? Competency tests are intended to prove a student's qualification to move to the next level. In the case of 4B, there is not a next level, and the state test can stand as such a competency test.

The topic of apprenticeship hours was discussed in the March meeting. Clearly, on-the-job hours for apprentices are essential to ensure they are experienced before qualifying to test for a journeyman license. I don't believe that any of us involved with plumbing education would contend with that requirement. Nor would we ever ask that apprentices be allowed to test any earlier than 4B, as was suggested by a member at the meeting. Not only would that be a clear disadvantage to the apprentices learning experience, but it would decrease enrollment in our programs, which would not be appreciated or approved by our educational administrators.

However, as we consider the requirements for apprentices to be in class for 72 hours per semester or 576 hours total of classroom instruction, I would respectfully ask the Board to consider, what is the purpose of that requirement? I submit that the purpose of in-class hours is to provide time for students to gain competence in the trade. As an educator, I believe that competence is far more important than time spent in a seat, and I have observed that students achieve competence at different rates, some faster than others.

I would also ask the Board to consider the purpose of the state written exam. Is it not to prove that a hopeful candidate is competent in the required knowledge of plumbing?

And if an apprentice has proven competence by passing the state test, is it necessary to require further time sitting in a seat, just to satisfy a law that states that students have to sit in a seat? This is not in harmony with the purpose of the hours or the test. Once a student has proven competency, they should be deemed qualified and allowed to move forward to further success in their career.

With that in mind, I would ask that you review and consider what is written in the Application Checklist and Instructions on page 5 of the Journeyman Plumber License Application. Under the subsection "Journeyman Plumber (JP)" the requirement states "Official transcripts showing completion of an approved apprenticeship program…" Under the subsection "Residential Journeyman Plumber (RJP)" the requirement states "Official transcripts showing completion of a minimum of 432 hours of an approved apprenticeship program…" Please notice that in this application, there is not an hour requirement for the Journeyman Plumber. While the hours are clearly written in the law, they are not reflected in the application.

If a student in 4B fails the state test, they are still enrolled in 4B. The curriculum in 4B is not intended to "teach to the test". But when a student that has failed the state test has questions about any particular topic, it is our opportunity as educators to help them with their understanding, and we are more than happy to do so. Our entire job is to help them become competent, and this provides an excellent learning experience for the students.

Also, on the topic of failing the state test, a comment was made that when a student fails a state test, they are wasting state resources. That is an unfair statement. Applicants have to pay for every test they take, and none of them want to take it more than once.

As many in the meeting stated, this needs to be resolved in writing so that we can all move forward with a better understanding of how this is to be handled. I would respectfully request that at a minimum the board leave in place the option for plumbers to test during their 4B semester because this has done great things to motivate our students and increase the number of competent, qualified journeyman plumbers, which is exactly what this state needs! Further, I would request that the Board keep the requirement for 4B on the transcript but allow the educational institutions to award credit for the semester as they see fit.

In my opinion, the worst thing that the Board could do, would be to say that just because this doesn't work for the apprentice electricians, it will not be allowed for the apprentice plumbers. (Plumbers are not required to adhere to the same standards as the electrical programs with the Department of Labor.) Such a decision would condemn the plumbing apprenticeships to return to the poor performance and poor success rates that are commonly seen among electricians completing their apprenticeship. If anything, early 4th year testing should be enabled for both plumbers and electricians. Shawn Swapp of Davis Tech expressed his interest in that option for the electricians during the meeting as well.

Thank you again for your service and for your consideration. I will attend the next board meeting, to learn of your further discussion of the matter.

Sincerely,

Thomas T. Hicken

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