



SENATE RESOLUTION # 2988

TITLE: Support of Adopting the Quantum Information Science & Engineering Master's Degree Program

DATE INTRODUCED: XX/XX/2024

AUTHOR: First-Year Senator Shosh

SPONSORS: Senator Keasling, Gomelsky, Schliebe, Gundling, First-Year Senators Hargett, Morales, Director of Policy and Analysis Meester

1. WHEREAS, the purpose of the Associated Students of the University of Wyoming
2. (ASUW) is to serve our fellow students in the best manner possible; and,
3. WHEREAS the Quantum Information Science & Engineering
4. (QISEE) Master's Degree Program will expand the majors available for
5. graduate students in the School of Computing, Astronomy & Physics, and Electrical
6. Engineering and Computing programs; and,
7. WHEREAS, the QISEE Master's degree program will be a postgraduate program that
8. focuses on the theoretical and practical aspects of quantum computing and
9. quantum information processing with more specific descriptions found in Addendum A;
10. and,
11. WHEREAS, The Master of Science in QISEE program consists of two years of
12. coursework, 30 credits, and an accepted thesis; and,
13. WHEREAS, the proposed launch date for these programs is Fall 2024; and,
14. WHEREAS, the program follows the general track outlined by Addendum B, though
15. sequencing and specific courses may differ based on specialization tracks or allow
16. for content-specific course selection/substitution flexibility; and,


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17. WHEREAS, the QISEE Master's Degree Program will create new resources for
18. students in the School of Computing, Astronomy & Physics, and Electrical Engineering
19. And computing programs; and,
20. WHEREAS, students in these programs are in support of a QISEE Master's Degree
21. Program as outlined in Addendum C; and,
22. WHEREAS, there is a demand for this program based on the MS QISEE New Degree
23. feasibility study document, from the Office of Online & Continuing Education's
24. market analysis generated from Gray Associates' data as outlined in Addendum D; and,
25. WHEREAS, over 109,836 students in the western region have completed their
26. Bachelor's Degree in computer science and are potential future students for a QISEE
27. Master's Degree Program; and,
28. WHEREAS, The estimated additional revenues for 5 resident students and
29. 5 nonresidents entering the QISEE Master's Degree Program each year is about
30. \$190,000 per year; and,
31. WHEREAS, the only universities in this region of the United States offering a QISEE
32. Master's Degree Program are University of Colorado in Boulder and the University of
33. New Mexico; and,
34. WHEREAS, it is imperative to attract more students to UW to deal with the impeding
35. enrollment cliff; and,
36. WHEREAS, ASUW recently passed a resolution acknowledging said enrollment cliff;
37. and,
38. WHEREAS, adapting the QISEE Master's Degree Program will help UW students
39. remain competitive in emerging science fields; and,
40. WHEREAS, Upper Administration has reached out to ASUW specifically asking for

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41. feedback on this new graduate degree program as shown in Addendum E; and,
42. THEREFORE, be it resolved that the Associated Students of the University of Wyoming
43. support the implementation of a Quantum Information Science & Engineering
44. Master's Degree Program; and,
45. THEREFORE, be it further resolved that this resolution is circulated to the student body
46. through ASUW channels; and,
47. THEREFORE, be it further resolved that this resolution is sent to the Professor and Vice
48. Provost and Dean of the School of Graduate Education James C.M. Ahern, Board of
49. Trustees, and all corresponding departments.

Referred to: HOPE and AD&P

Date of Passage: April 16th, 2024 **Signed:** 
(ASUW Chairperson)

“Being enacted on April 16th, 2024, I do hereby sign my name hereto and approve this

Senate action.” 

ASUW President

Addendum A

4. Course Descriptions

- **Quantum Mechanics:** This course provides a comprehensive understanding of the mathematical formalism and fundamental principles of quantum mechanics. It explores wave-particle duality, superposition, entanglement, and quantum measurement.
- **Quantum Computing:** This course focuses on the principles and algorithms of quantum computing. It covers qubits, quantum gates, quantum circuits, quantum algorithms (e.g., Shor's algorithm, Grover's algorithm), quantum error correction, and quantum simulation.
- **Quantum Information Theory:** This course introduces students to the mathematical foundations of quantum information theory. It covers topics such as quantum entropy, quantum entanglement, quantum teleportation, quantum cryptography, and quantum communication protocols.
- **Quantum Algorithms and Applications:** This course delves deeper into the practical applications of quantum computing. It explores various quantum algorithms for database searching, optimization, machine learning, and chemistry simulations.
- **Quantum Hardware and Technology:** This course provides an overview of the different types of quantum hardware platforms, such as superconducting circuits, trapped ions, topological qubits, and photonic systems. It covers the challenges and advancements in building and scaling quantum computers.

Addendum B

3. Curriculum Map and Program Structure

This curriculum map provides a general overview of courses to include in the QISE Master's program. The sequencing and specific courses may differ based on specialization tracks or allow for content-specific course selection/substitution flexibility. Additionally, practical projects, internships, or industry collaborations may be integrated into courses to provide hands-on experience and real-world applications of QISE concepts. UW currently offers several courses this program would require, but this collaborative feature would distinguish students and opportunities in this program.

Year 1

Fall

- Quantum Mechanics
- Introduction to Quantum Computing
- Elective

Spring

- Quantum Information Theory
- Quantum Algorithms and Applications
- Elective

Year 2

Fall

- Quantum Hardware and Technology
- Research Methods
- Elective

Spring

- EE 5960 Thesis Research: Credits: 4; Designed for students involved in research for their thesis project. It is also used for students whose coursework is complete and who are writing their thesis.

Addendum C

I am writing today to sponsor the proposed bill to adopt a Quantum Information and Engineering Masters' degree program. Quantum Information is on the cutting edge of computer science and physics. These fields are yet to be fully explored and research into these topics will prove incredibly useful for mankind going forward. While not yet the main thrust of many companies' future plans, the addition of a master's degree program Quantum Information and Engineering research will be useful in attracting new students to the University of Wyoming, retaining those students for the new master's degree program, as well as preparing those students for working in the future of Quantum Engineering.

The University of Wyoming can help to make its Computer Science department even more desirable to students looking for a career in these cutting-edge fields. Therefore, it is our opinion that the University of Wyoming should support this new master's degree program.

Thank you,
Will Greiner
Computer Science, Sophomore

Cosigned,
Daniel Collins
Computer Science, Sophomore
Benjamin Watts
Computer Science, Sophomore
Cian Melker
Computer Science, Sophomore

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Addendum D

MS QISE New Degree Feasibility Study

<https://uwyo.sharepoint.com/sites/ASUWStudentGovernment/Shared%20Documents/Forms/AllItems.aspx?id=%2Fsites%2FASUWStudentGovernment%2FShared%20Documents%2FLegislative%20Draft%20Folder%2FGraduate%20Programs%2FMS%2DQISE%2Dnew%2Ddegree%2Dfeasibility%2Epdf&parent=%2Fsites%2FASUWStudentGovernment%2FShared%20Documents%2FLegislative%20Draft%20Folder%2FGraduate%20Programs>

Addendum E

From: James C Ahern <JAhern@uwyo.edu>

Sent: Thursday, February 22, 2024 8:28 AM

To: ASUW President <ASUWPres@uwyo.edu>; Staff Senate President <sspresident@uwyo.edu>

Subject: New Graduate Degree Proposals

Dear President Murfitt and President Comeau,

I have attached feasibility studies and associated materials for three proposed graduate degrees:

MS in Quantum Information Science & Engineering

MS in Artificial Intelligence

PhD in English

If your bodies would like to review these, your feedback would be very appreciated. Given that these programs have Fall 2024 start dates, we hope to take them to the Trustees for authorization at their May meeting. These proposals have also been transmitted to Faculty Senate and Graduate Council.

Please let me know if you have any questions or need any additional information.

Thank you.

Best,
Jim