PROPOSAL TO EXTEND AN EXISTING DEGREE TO ANOTHER CAMPUS (PHYSICAL OR GLOBAL)

Proposals will only be accepted electronically as a Word document to the Office of the Provost when submitted to provost.deg.changes@wsu.edu

Degree Title:	Bachelor of Science in Computer Engineering
Academic Program:	Computer Engineering
Academic Plan:	Bachelor of Science in Computer Engineering
Number of Credits:	124
Department(s) or Program(s):	Electrical Engineering and Computer Science
Campus(es):	Everett
College(s):	Voiland College of Engineering and Architecture
Method of Instructional Delivery:	Classroom and instructional delivery system (Canvas)

Contact Name:	Jacob Murray	Email Address:	jamurray@wsu.edu
Contact Phone:	425-405-1735	*Proposed start date:	Spring 2026

Proposed Start Date: Advertising of the proposed degree cannot commence until approved by Washington State University and added to the Northwest Commission on Colleges and Universities (NWCCU) degree catalog.
Approval notification will be sent by the Office of the Provost and Executive Vice President.

Proposal

Mission and Strategic Goals:

Provide a clear statement of the nature and purposes of the degree extension to a different campus in the context of WSU's mission and strategic plan.

Washington State University (WSU) Everett aims to expand its educational offerings to the Everett campus by extending a Bachelor of Science degree in Computer Engineering. This initiative is designed to fulfill WSU's mission of providing practical education, fostering scholarly inquiry, and sharing expertise to benefit society. The program will: encourage students and faculty to engage in cutting-edge research and creative activities that address the needs of our local community; provide students in the North Puget Sound region with access to high-quality education in computer engineering; offer experiential learning opportunities, including internships, research projects, and industry collaborations, to prepare students as future leaders and global citizens; strengthen WSU's role as a leader in advancing quality of life and economic development in the Everett region; and leverage WSU's multi-campus system to provide resources and support for the new program.

Educational Offerings:

Describe the degree program, including the total number of credits required. Provide the four-year degree plan (undergraduate) or appropriate plan of study (graduate and professional).

Computer engineering is a field of study that encompasses the fundamental principles, methods, and modern tools for the design and implementation of computing systems. Advances in technology are yielding smaller and higher-performing computer systems that appear in various applications, including communication systems, consumer products, and household appliances to name just a few. The computer engineering program provides a balanced perspective of both hardware and software elements of computing systems, and of their relative design trade-offs and applications. Computer engineering builds upon fundamental courses in mathematics, science, and the engineering disciplines to achieve a sound knowledge foundation and to develop breadth. Laboratory experiences are emphasized to provide students with background on experimental design and simulation

techniques. Since core course sequences are completed in the junior year, students are able to pursue their career objectives with opportunities to select from a broad range of elective courses. These include computer engineering topics such as hardware design, VLSI design, embedded systems, computer architecture, networking, and operating systems.

The program culminates with a two-semester senior design project. The project involves industry cooperation and provides students with a major design experience addressing a broad range of issues, including technical subjects as well as economics, safety, and ethical and societal considerations.

The Computer Engineering degree consists of a total of 124 credits. At WSU Everett, students interested in the Computer Engineering degree would transfer from a local community college with their Associates of Science Transfer degree (AST). As such, a 2-year upper-division course plan for a Computer Engineering student is shown below. This plan aligns with the majority of course offerings in EECS already available on the Everett campus.

Sample 2 year BS Computer Engineering plan:

Year 1 (Junior year):
Fall I:
EE 311	3
EE 321	3
EE 352	3
STAT 360	3
Total	12

Spring I:
EE 234	4
EE 324	4
EE 302 / 341	3
CPTS 360*	4
Total	15

Fall II:
EE 415	3
EE 334*	3
EE 466* / Elective I	3
EE 331 / 302	3
Total	12

Spring II:
EE 416	3
EE 434 / Elective II	3
Elective III	3
Elective IV	3
HIST 305 (if needed)	3
Total	15

Provide descriptive information regarding the method(s) of instructional delivery (percent face-to-face, hybrid, distance, and/or competency-based).

As discussed above, the majority of courses above are face-to-face local version offerings.

Course(s) currently offered locally (face-to-face): EE 234, 302, 311, 321, 324, 331 (or 341), 352, 415, 416, STAT 360
Course(s) proposed to be offered locally (face-to-face): EE 334, (optional) EE 466, CPT S 360, HIST 305
Course(s) currently broadcast from Pullman campus: EE 434
Course(s) proposed to be broadcast from Pullman campus:

Additionally, there are a variety of face-to-face and broadcast options currently available for the computer engineering electives.

Assessment of Student Learning and Student Achievement*:
For graduate programs, please contact the Graduate School before completing this section.

For undergraduate programs, provide the department's current plan for assessing student learning outcomes and describe how it will be successfully applied at the new location.

To lay a foundation for the successful accreditation of EECS degree programs, and to continuously improve them, the School of EECS engages in a continuous improvement process, in accordance with requirements for ABET accreditation. This process, which is thoroughly documented in the "School of EECS Assessment Manual," collects seven different forms of assessment data:

- Student coursework
- Professional skills discussions
- Senior design teamwork surveys
- Senior exit surveys
- Junior writing portfolio
- Executive Council discussions
- Faculty Retreat discussions

Using systematic and principled processes documented in the Assessment Manual, EECS assesses these data according to a regular schedule, and document the results in an annual report. The results presented in the annual report are organized around the seven data sources listed above. However, as we have a two-year assessment cycle, not all seven items are necessarily discussed in a given year. Note that all assessment data we have collected in recent years are stored in an EECS Assessment archive.

The School of EECS follows this assessment process for its programs across the system, and this process includes the programs that already exist on the Everett Campus (EE, SE, Cyber). Extending the Computer Engineering degree program would follow an identical approach for both continuous assessment as well as extending the ABET accreditation to the new Everett degree.

For reference, the student learning outcomes for the Computer Engineering degree are 1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; 2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; 3) an ability to communicate effectively with a range of audiences; 4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts; 5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives; 6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions and produce solutions; 7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Planning:

Describe plans and include descriptions which provide evidence of: 1. The need for the degree to be extended.

The Seattle region is home to numerous prominent employers in the technology and engineering sectors, making it an ideal location for a Computer Engineering program. Major companies such as Amazon, Microsoft, Boeing, and T-Mobile are headquartered in the area. These companies, along with tech firms and startups provide ample opportunities for internships, research collaborations, and employment opportunities for graduates. The presence of these industry leaders underscores the demand for skilled computer engineers and the potential for strong industry-academic partnerships.
Additionally, with the recent passing of the CHIPS and Science Act in 2022 has significantly boosted the semiconductor industry in the United States. This legislation includes a $53 billion investment in the U.S. semiconductor manufacturing, research and development, along with tax incentives for capital investments in semiconductor manufacturing. By extending the Computer Engineering program to Everett, WSU can contribute to the growing demand for skilled professionals in the semiconductor industry, further supported by the CHIPS Act. This alignment with national priorities enhances WSU's role in driving technological innovation and economic growth.

2. The student population to be served.
   - Provide realistic justification for the projected FTE.
   - How can transfer students articulate smoothly into the program and complete it with approximately the same number of total credits as students who enter WSU as freshmen?
   - Please describe specific efforts planned to recruit and retain underrepresented students in this discipline.

Information provided by the Washington State Employment Security Department regarding "Occupations in Demand" demonstrates that occupations requiring a bachelor's in computer engineering are projected to be in higher demand. The 2017 Washington State Regional Educational Needs Assessment listed computer occupations as highly important according to employers in the region. For example, the "software developers, applications" occupation which requires a bachelor's degree is projected to have 24,742 average annual openings statewide from 2017-2027. Another example is the "software developers, systems software" occupation. This occupation is projected to be in-demand statewide with estimated annual job opening of 6,071. In a study for WSU Everett, Ruffalo Noel Levitz (RNL) projects these findings as important well into 2031, where occupations related to computer science, including computer engineering, will grow in need over 14% on average.

During the 2018-19 school year, 12 community colleges within the WSU-E extended service area graduated 900 students with a transfer associate degree focused on STEM. This was a 7% increase from the previous year, and a 12% increase from 2016. Within Snohomish County for the 2018-19 school year, Edmonds Community College and Everett Community College combined for a total of 192 graduates with a STEM focus. In 2017 the SBCTC and Washington Achievement Council reported that, "the largest supply and demand gap at the baccalaureate level is in computer science and information technology, with the majority of jobs going to software developers, programmers, and systems analysts." RNL cites that there are over 400,000 individuals who fit the baccalaureate serviceable category in WSU Everett's regional influence. These are individuals ready to enter the pipeline with high school diplomas and/or some-college-no-degree.

Post-pandemic numbers from SBCTC groups have been difficult to assess given the fluctuations in college attendance. However, Everett Community College graduated over 1,000 associates earning students from 2022-2023 according to SBCTC. Other feeder institutions such as Edmonds, Shoreline, and Skagit all combined for over 1,900 associates earning students in the same timeframe. Of these graduates at these institutions, SBCTC reports that over 150 earned a STEM focused transfer degree. RNL asserts that computer science related degrees are a category one program prioritization for WSU Everett in the region. With related job fields expected to grow over 19% in the coming years, this is a highly sought after degree market. The Education Research & Data Center indicates that over 38% of Washington SAT takers intend on completing a STEM related college major, which was last updated in 2023.

Enrollment Projections:
2026-27: 10
2027-28: 15
2028-29: 20
2029-30: 25
2030-31: 30

Transfer students, especially students transferring from Everett Community College (or other local community colleges), will be well prepared for degree transfer to the Computer Engineering degree at WSU Everett with either a Direct Transfer Agreement (DTA) or Associates of Science Transfer (AST) degree.

Recently, WSU Everett opened the second in the state MESA (Mathematics, Engineering, Science Achievement) center at the University level. Washington MESA provides enrichment and access opportunities to science, technology, engineering, and mathematics (STEM) programs for grades 6 –12 and college students across the state with the goal of increasing representation of historically underrepresented students of color and women in STEM fields. Our programs support students through college and as they prepare for careers in STEM. We provide students with tutoring, specialized courses, mentorship, and supportive networks. Additionally, the large network of community college students completing their two-year STEM degrees through MESA programs have an opportunity at WSU Everett specifically to continue having these additional supports through their Baccalaureate degree.

3. Procedures used in arriving at the decision to extend the degree (e.g., consultation with advisory boards, input from industry or employers, commissioned studies, faculty task force, etc.).

With the confluence of industry and employer feedback, federal legislation through the CHIPS act, input from a WSU Everett commissioned study by RNL, direct feedback from community college faculty, and internal department and college-level discussions, we arrived at the decision to extend the Computer Engineering degree to the Everett Campus.

Additionally, with the currently available resources in terms of EECS faculty at WSU Everett, the Computer Engineering degree implementation will be an extremely low lift.

4. Organizational arrangements required within the institution to accommodate the degree extension.

Currently, Electrical Engineering, Software Engineering, and Cybersecurity programs are offered at WSU Everett.

The additional coursework for offering the BS in Computer Engineering is manageable given the existing courses offered in other EECS degrees on the Everett Campus:

1. EE 334
2. CPT S 360
3. EE 434 OR EE 466 (1 of these choices is all that would be needed)

These 3 courses are the only additional course requirements necessary beyond the current Everett course catalog for offering the Computer Engineering degree to the Everett campus. Additionally, WSU Everett offers CPT S 370, which provides an operating systems course in Java as opposed to the CPT S 360 version, which is based on the C programming language. For the last two Spring Semesters (Spring '23 and Spring '24), EE 434 has been a broadcast elective to Everett students from a Pullman faculty member.

Options for EE 334:
- Broadcast from Pullman
- Teach locally (adjunct or current instructor). We have several faculty members within the Electrical Engineering and Cybersecurity programs with expertise in Computer Engineering. Either faculty would be well qualified to locally offer this course.

Options for CPT S 360:
- Teach locally (adjunct or current instructor). As mentioned above, we currently offer the equivalent Java course, CPT S 370. We will be offering CPT S 360 locally starting in Spring 2025 (which works better for our SE students as they are more commonly following a C/C++ programming track).

Options for the Computer Engineering Senior Design Elective:
Can be EE 434 or EE 466. As mentioned, WSU Everett has received EE 434 via broadcast from Pullman for several years already as an additional elective option available to our EE students. It would be beneficial to offer a local option for the students, so in this case we would consider a local offering of EE 466. However, depending on resources, this course could also be broadcast from Pullman.

5. Lay out a three-year timetable for implementation, including hiring plans, partnership contracts if needed, facilities modification, recruiting, and other elements of implementation. Provide dates for each step.

Due to the current existing EECS faculty as well as the current existing course offerings on the WSU Everett campus, extension of the Computer Engineering degree is effectively ready to launch immediately. A focus on recruiting for this new program would happen as soon as program extension and NWCCU approvals would be granted.

Budget:

☒ Attach the Financial Worksheet with five-year FTE, revenue and expenditure projections. Fully account for costs such as staff support, training, library, facilities and so on.

Please describe the funding picture narratively, including funding sources, department, college and/or campus commitments, investments already made, one-time costs, facilities costs (labs, classrooms, offices, telecom, etc.) and library costs.
No additional funding resources are being requested for this proposal.

Student Services:

Describe the capacity of student support services to accommodate the degree extension at this location. Include a description of admissions, financial aid, advising, library, tutoring, and other services specific to this request.
Based on current enrollments at the WSU Everett campus. The projected enrollments for this degree program would not impact the student support services currently available.

Describe the implications of the degree extension for services to the rest of the student body.
Based on current enrollments at the WSU Everett campus. The projected enrollments for this degree program would not impact any services available to the rest of the student body.

Physical Facilities and Equipment:

Outline the provision(s) made for physical facilities and equipment at the proposed location that will support the program and its projected growth. Include videoconferencing and other technologies that support course delivery, as well as classrooms, labs, and office space.
No additional facilities or equipment are being requested for this proposal nor its projected future growth. Videoconferencing is available widely in all classroom spaces. The addition and/or restructuring of the 3 proposed courses will not impact classroom availability. The additional seats in the courses would be available for medium / large classroom spaces in the WSU Everett building to accommodate additional students in these courses.

Library and Information Resources:

Using the Library Analysis form, describe the availability and adequacy of library and information resources for this degree, degree level, and location. Note plans to address gaps.

As is for all degree programs at WSU Everett, students in the Computer Engineering degree program would have identical access (book delivery / online libraries access). This level of access is adequate for the Computer Engineering degree program and its courses.

Faculty:

- List the educational and professional qualifications of the faculty relative to their individual teaching assignments.
- List the anticipated sources or plans to secure qualified faculty and staff.

The proposed additional courses would be offered by current WSU Everett faculty:

EE 334 / EE 466 : Taught by either Dr. Linus Lu or Dr. Jacob Murray
CPT S 360: Taught by Dr. Jeremy Thompson or Dr. Linus Lu. Dr. Thompson already teaches the Java equivalent course CPT S 370.

Dr. Linus Lu – PhD in Computer Science and Engineering from UCLA in 1991. IEEE Fellow. 3 book chapters, 42 journal papers, 92 conference proceedings, 200 issued patents. Former director of design and technology at TSMC and former director at Intel Labs.

Dr. Jacob Murray – PhD in Electrical and Computer Engineering from WSU in 2014. IEEE Senior Member. 1 book, 1 book chapter, 6 journal papers, 12 conference proceedings.

Impact on Other Locations/Programs:

Briefly describe any impacts on other WSU programs and locations, and how you came to these conclusions (who was consulted?). If there are potential adverse impacts, describe how these will be addressed. Consider such things as: reallocation of faculty time, reallocation of AOI courses, impact of blended courses, internal competition, "cannibalization" of other programs, curricular effects for other degrees, effects on recruitment markets for other campuses. Indicate how such problems will be addressed for each campus or department affected.

We do not anticipate any impacts to other WSU programs or locations. Consultation was done with the department and college, with the staff and administration at the campus, and with external stakeholders. We believe that typically, students interested in the Everett campus are non-traditional and/or place bound. We are recruiting students directly from local community colleges. Based on feedback from community college faculty as well as prior noted student interest, this degree program would recruit new students who may not have had interest in the Electrical Engineering or Software Engineering programs directly. Additionally, the recruited students in Computer Engineering would help bolster enrollments in courses already on the books in Everett.

Sustainability:

What are the plans for continuing the program past 5 years if the goals for enrollment are not met, or other circumstances prevent the execution of the plan described here?

As this degree program will leverage current degree offerings in Everett from EECS, we believe that there would be no significant concerns regarding sustainability if enrollments were not met. Specifically, no new funding is being requested, as the current course offerings, facilities and labs, and support services can handle the increased load introduced by this new degree program.
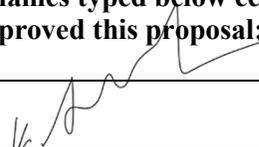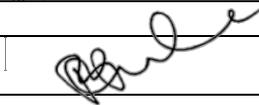
Attachments:
- ☒ Financial Worksheet
- ☒ Demand Analysis
- ☒ Library Analysis

☐ Four-Year Degree Plan (undergraduate); curriculum overview (graduate and professional)
☐ Letters of financial commitment
☐ Contracts or MOUs if applicable

Submit completed form as a Word document to the Provost's Office at provost.deg.changes@wsu.edu

SIGNATURES: The names typed below certify that the relevant academic and campus officials have reviewed and approved this proposal;

Chair or Director Signature:		Date:	10/15/2024

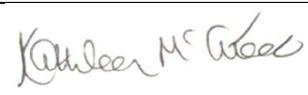| Dean Signature:		Date:	10/15/2024

Signatures are required from all Chancellors (or delegates). A signature denotes endorsement if the degree will be offered and/or impact the respective campus. A signature will also denote receipt of notification if the degree is not being offered and/or will impact the respective campus. If needed, a signature abstention box is provided immediately below.

Everett Chancellor Signature:		Date:	8/30/24

Global Chancellor Signature:	Dave Cillay (by email to Kelly Newell)	Date:	10/16/24

Pullman Chancellor Signature:	Dave Cillay (by email to Kelly Newell)	Date:	10/16/24

Spokane Chancellor Signature:		Date:	11/12/2024

Tri-Cities Chancellor Signature:		Date:	11/5/2024

Vancouver Chancellor Signature:		Date	10/17/2024

Comments regarding abstention of signature(s)

Submit completed form as a Word document to the Provost's Office at provost.deg.changes@wsu.edu

Provost's Office Signature:		Date:	

For Registrar's Office Use Only:					
Current CIP Code:		New CIP Code:		Date:	