

2016-2017 Catalog

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Volume 5.2

**(BS) Bachelor of
Science Degrees**

**(AAS) Associate of
Applied Science
Degrees**

Civil Engineering Technology



Mechanical Engineering Technology

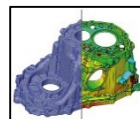


Process
Piping &
Aero/
Auto/Wind
Manufacturing

**Degree Minors &
Continuing Education
Courses**



**Architectural
Engineering**



**Manufacturing
& Metrology
Engineering**



**Construction
Management**



**Process
Engineering**



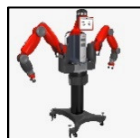
**Environmental
& Agricultural
Engineering**



**Renewable
Energy
Engineering**



**Land
Surveying**



**Robotics
Engineering**



Institute Mission Statement:

“The mission of the Washington Engineering Institute is to provide practical science, technology, engineering, and mathematics curriculum, driven by industry needs, and instructed by respected professionals with practical industry experience. The goal is to produce positive and motivated graduates with technical job skills that are highly desirable to industry.”

Institute Purpose Statements:

<u>Industry Focus</u>	Offer practical degrees that have industry careers as an outcome.
<u>Respected Faculty</u>	Faculty shall be respected professionals with practical industry experience.
<u>Reduce Admin</u>	The Institute shall minimize academic administration to keep tuition low.
<u>Low Tuition</u>	\$5,400 per typical (45) Credit school year.
<u>No Extra Fees</u>	\$0 – No Fees
<u>No Textbook Costs</u>	\$0 – Check textbooks out from the engineering library.
<u>All Evening Courses</u>	Offer most courses in the evenings, so students and faculty can work during the day.
<u>Block Courses</u>	Offer courses in (4) to (6) week blocks, so students can take courses one at a time.

College Authorization Statement:

Washington Engineering Institute is authorized by the Washington Student Achievement Council and meets the requirements and minimum education standards established for degree-granting institutions under the Degree-Granting Institutions Act. This Authorization is subject to periodic review and authorizes the Washington Engineering Institute to offer specific degree programs. The Council may be contacted for a list of currently authorized programs. Authorization by the Council does not carry with it an endorsement by the Council of the institution or its programs. Any person desiring information about the requirements of the act or the applicability of those requirements to the institution may contact the Council at P.O. Box 43430, Olympia, WA 98504-3430

Equal Opportunity Statement:

The Washington Engineering Institute provides equal opportunity in education and employment, and does not discriminate on the basis of race, ethnicity, creed, color, sex, national origin, age, marital status, religious preference, the presence of any sensory, mental, or physical disability, reliance on public assistance, sexual orientation, or status as a disabled person. Questions regarding this policy should be directed to the Academic Director, 360-739-1428

Washington Engineering Institute

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Washington Engineering Institute

Address and Map

Address

Washington Engineering Institute
1414 Meador Avenue, Suite 104
Bellingham, WA 98229
Web: www.weiedu.org

Admissions

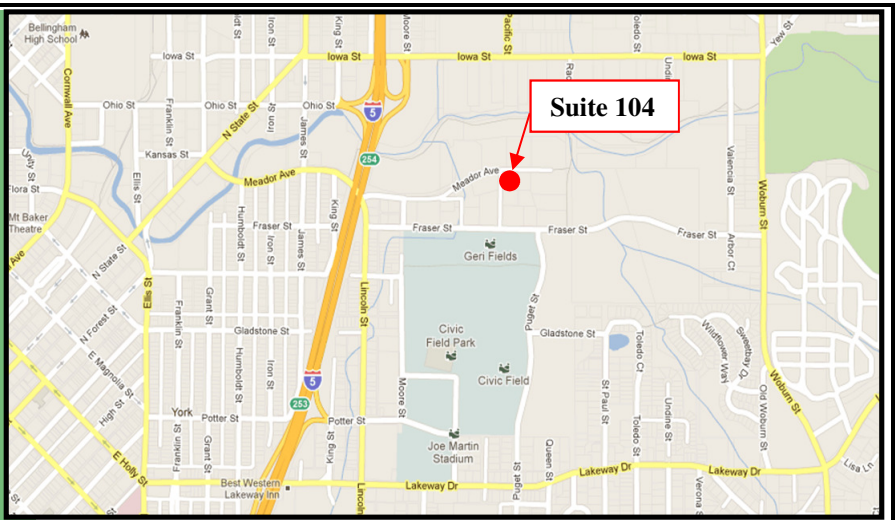
Phone: (360) 795-7485
Email: admin@weiedu.org

Administration

Phone: (360) 739-1428
Email: dbren@weiedu.org

Map

1. Find the Haskell Business Center, which is directly across from the Civic Center Softball Fields
2. Take Express Drive North into the Business Center
3. At the corner of Meador Avenue and Express Drive
4. Look for the Lettered Building H, Suite 104



Fall Quarter 2016	
September 5	Labor Day Holiday, No Classes
September 6	Fall Quarter Begins
November 11	Veteran's Day, No Classes
November 24-25	Thanksgiving Holiday, No Classes
December 17	Fall Quarter Ends
December 18- Jan. 2	Winter Break

Winter Quarter 2017	
January 3	Winter Quarter Begins
January 16	Martin Luther King, Jr. Day, No Classes
February 20	President's Day, No Classes
March 26	Winter Quarter Ends
March 27 - April 2	Spring Break

Spring Quarter 2017	
April 3	Spring Quarter Begins
May 29	Memorial Day, No Classes
June 16	Graduation
June 24	Spring Quarter Ends
June 25 - July 3	Summer Break

Summer Quarter 2017	
July 4	Independence Day, No Classes
July 5	Summer Quarter Begins
August 26	Summer Quarter Ends
Aug. 27 – Sept. 3	Fall Break

Accreditation Status: The Institute is currently pursuing national accreditation. However, the national accreditation process can take several years. Accreditation is not automatic, it must be earned. The Institute is following an accreditation plan to provide national accreditation as-soon-as practicable.

Private Ownership: The Institute is privately owned and operated by Dave and Katherine Bren. Dave and Katherine Bren both hold Masters of Science Degrees in Engineering, have many years of private engineering experience, and many years of teaching experience. Dave and Katherine Bren are committed to the success of the Institute and regularly teach classes, advise students, and conduct administrative duties for the Institute.

Advisory Committees: Program areas have advisory committees made up of industry professionals and faculty members who support and guide the curriculum, facilities, equipment, and instruction.

Civil Engineering Technology Advisory Committee Members:

Mike Hames Heavy Civil Contractor	Martin Kjelstad, PE Civil Engineer
Bob Morse, PLS Land Surveyor	Jeff Vanderyacht, PE Civil Engineer

Mechanical Engineering Technology Advisory Committee Members:

Dustin Durham Process Piping Designer	Ben Schouten, PE Mechanical Engineer
John Vanden Bosche, PE Mechanical Engineer	Dave Weidkamp, M.Ed. Software Trainor and Educator

Administrative Officers: The Institute is very small and our administrators are involved in teaching coursework as well as administrative functions. The administrative officers for the Institute are as follows:

Dave C. Bren, PE, MSCE President and Academic Director	Kristina Daheim, MA Admissions and Student Services
Katherine Bren, EIT, MSE Business and Library Services	Janelle Miner, M.Ed. Registrar

Faculty Members: Many of the Institute faculty are practicing professionals that work in the industry during the day. Practicing professionals bring the industry to the classroom ensuring that the curriculum is driven by industry needs. A detailed list of faculty and credentials can be found in this catalog.

Continuing Education Courses:

Students taking courses for continuing education simply fill out a registration form. Continuing education students **do not** have seniority for course space and take courses on a space available basis.

#	Step	Actions
1	Registration Form	Email, mail, or deliver a completed registration form to WEI Admissions.

Freshman Enrollment:

Incoming freshman that have **or** will earn a high school diploma / GED before starting classes, shall complete the following admissions steps:

#	Step	Actions
1	Registration Form	Email, mail, or deliver a completed registration form to WEI Admissions.
2	Testing Scores	Testing is used to determine a candidate's ability-to-benefit from a degree program. WEI accepts <u>either one</u> of the following: Ⓐ <u>WEI Entrance Exam:</u> A free exam that you schedule and take at WEI or at a Career Center proctored by WEI Admissions. Ⓑ <u>SAT/ACT Test Scores:</u> A standardized exam provided by others and taken at various sites. If you took it, please have your SAT/ACT test scores sent to WEI.
3	(Optional) Cover Letter and Recommendations	A cover letter and copies of workplace/teacher recommendations are optional.
4	Enrollment Form	Email, mail, or deliver a completed enrollment agreement form to WEI Admissions. A parent/guardian must sign if you are under (18) years of age.
5	Letter of Acceptance	When the application is complete, the candidate application is evaluated by WEI Admissions Staff. Upon staff recommendation, the Admissions Director may issue a Letter of Acceptance for enrollment into a degree program.
6	Advisor/Mentor Degree Planning	Newly enrolled degree program students are then assigned a program advisor/mentor that will help them with degree planning and beyond.

Transfer Enrollment:

Incoming students that have college credits or degrees to transfer, shall complete the following admissions steps:

#	Step	Actions
1	Registration Form	Email, mail, or deliver a completed registration form to WEI Admissions.
2	Send Official Transcripts	Have official transcripts sent from all previous colleges to: WEI Admissions 1414 Meador Avenue, Suite 104 Bellingham, WA 98229 Only the WEI Registrar can make final determinations on courses transfers.
3	Entrance Exam	Schedule and Take the WEI Entrance Exam to determine if you need remedial coursework for your degree program.
4	(Optional) Cover Letter and Recommendations	A cover letter and copies of workplace/teacher recommendations are optional.
5	Enrollment Form	Email, mail, or deliver a completed enrollment agreement form to WEI Admissions.
6	Letter of Acceptance	When the application is complete, the candidate application is evaluated by WEI Admissions Staff. Upon staff recommendation, the Admissions Director may issue a Letter of Acceptance for enrollment into a degree program.
7	Advisor/Mentor Degree Planning	Newly enrolled degree program students are then assigned a program advisor/mentor that will help them with degree planning and beyond.

Degree Transfer Notes: Direct transfers to start the upper division **junior** year must hold an associate of applied science (AAS) or associate of science transfer (AST) degree that closely matches the Institute's associates degree in that area of study. Examples include:

Civil Engineering Technology	Mechanical Engineering Technology
Engineering Technology	Engineering Technology
Civil Drafting	Mechanical Drafting
	Manufacturing Technology
	Mechatronics or Robotics Technology

Registration Seniority for Enrolled Degree Program Students: Students that are enrolled in a degree program have registration seniority over continuing education students for course space.

Articulation Agreement Credits: Students may request transfer of credit for courses that have been completed under a written articulation agreement between the Washington Engineering Institute and a college or high school. Courses to be transferred must be identified in the articulation agreement. In addition, the articulation documentation must identify the student, the courses they completed, and be signed by authorized parties in both institutions.

Transfer of Credits in to WEI: Students may request the transfer of credit for prior education, for any course(s) in their program. The Registrar shall have full authority to evaluate student provided transcripts and grant transfer credit for the requested course(s). At a minimum, twenty five percent (25%) of the total program credits required for a program must be completed at the Institute. The transfer credit award process is as follows:

1. Have an **official transcript** sent by mail to the Registration Office from your transfer institution
2. Notify the Registrar by email at jminer@weiedu.org that an official transcript is being sent and detail which classes you are requesting prior education credit
3. The Registrar will evaluate the prior education and update the student's official transcript for any prior education credit awarded. The student may request a copy of the updated transcript per standard transcript policy.

Course Challenge Credits: Students may request credit for industry training and work experience through the course challenge process. The course challenge process is a measurable and documentable way for a student to prove their knowledge in a course subject. Course challenge credit may not exceed twenty five percent (25%) of the total program credits. The Instructor of Record for the course shall have full authority to evaluate a course challenge under the following process steps:

1. The student will register for the course as normal.
2. The student will meet with the course instructor and present training and work experience for evaluation.
3. If the course instructor approves of the students presented knowledge they will then administer a course challenge, typically in the form of a final exam or final project and pass the exam to a standard B grade or better.
 - Should the student fail the course challenge they will continue the course, **paying full tuition.**
 - Should the student pass the course challenge the course instructor will notify the registrar of a successful course challenge and the student will pay a **\$50 tuition for course challenges.**

Experiential Learning Credits (None): The Institute **does not** award experiential learning credit. As an alternative, the Institute provides a course challenge process, where students can show their knowledge in a measurable and documentable way.

Advanced Placement Credits (None): The Institute **does not** award advanced placement credit. In short, the results of an entrance exam are **not** to be used to place students into higher level coursework. However, the results of an entrance exam may be used to require remedial coursework for the student. As an alternative, the Institute provides a course challenge process, where students can show their knowledge in a measurable and documentable way.

Transfer of Credit out of WEI: The Washington Engineering Institute is a working college **not** a transfer college. Credits earned at the Institute are unlikely to transfer to other colleges for two reasons:

- 1) The curriculum is heavily **focused on applied work skills**. Courses that prepare you for work do-not line-up well with academic theory based colleges for transfer.
- 2) The college and its degrees are State authorized, but they are not nationally accredited (see accreditation status). Therefore, Institute **credits are unlikely to transfer** to other colleges. A bachelor's degree at the Washington Engineering Institute is meant to be an end-all degree, to set you up for working **not** for transferring to another college.

Tuition Schedule: WEI is a private college, so the tuition rates are the same for everyone. The tuition rate schedule is as follows:

Fee	Amount	Unit
Tuition by Course Credit	\$120	Per Course Credit
Typical Yearly Tuition	\$5,400	Per (45) Credit Year
Course Challenge Tuition	\$50	Per Course Challenge

No Fees: WEI does not have fees.

Tuition Payment: Payment for courses is typically conducted as follows:

1. **Tuition Invoiced by Email:** Students are sent tuition invoices by email. Tuition invoices are typically emailed the week before a course begins.
2. **Bring Check on First Night:** Students typically pay by check at the beginning of class on the first night of the course. Please avoid paying tuition by cash.
3. **One Course at a Time:** Students typically take one course at a time. Therefore, students typically just pay for one course at a time.

WEI Bachelors Alumni (1/2) Tuition: WEI students that have graduated with the highest degree offered by WEI may take continuing education courses at half the current tuition rate. This is subject to space being available in the course, as continuing education students do not have seniority for course space.

Refunds: Students who submit a Request for Withdrawal to the Registrar (see page 13) will be entitled to a tuition refund based on the following schedule:

Course Percent Completed	Refund Amount
Refund requested before the course start date	100%
Refund requested before the course midpoint	50%
Refund requested on or after the course midpoint	0%

Course Cancellation Refunds: The Institute reserves the right to cancel courses that do not have at least (8) students, with at least 24 hours' notice of class start. Students will receive a full refund for the cancelled course tuition.

Tax Credit Information (Cannot Issue 1098T Forms): The Institute cannot take federal financial aid and is not an "eligible institution" for qualified education expenses. This means that Institute cannot issue 1098T forms to students, which makes deduction more difficult. Please consult your tax advisor for deduction methods and tax information.

Textbook Lending from Library: Course textbooks are available from the engineering library for check-out. This avoids the overhead costs of a bookstore. **Textbook lending** from the engineering library **saves students thousands of dollars** over a bachelor's degree program.

Supplies: Supplies purchasing is spread out through the program and item costs vary greatly on student choices for quantity and quality. The following list is **not** comprehensive; additional supplies may be required to meet the demands of the curriculum.

Typical Program Supplies
• 17" Laptop (~\$500 to 800)
• Student Version of MS Office (~\$100)
• Clear Presentation Binders (3 ring) for 12 Classes (~\$35)
• Mechanical Pencils and Erasers (~\$35)
• Engineer's Scale Stick (~\$8)
• Color Highlighters (~\$10)
• 11x17 Itoya Presentation Portfolio (~\$20)
• Scientific Calculator (~\$20+)
• Engineers' calculation paper pads (~\$35)
• Engineers' scale tape measure 25' (CET Only ~\$35)
• Rite in the Rain Survey Field Book (CET Only ~\$10)
• Survey Vest (CET Only ~\$100)
• Student Version of Rhino (MET Only ~200)
• Student Version of Solidworks (MET Only ~\$200)
• Basic Welding & Fabrication Equipment Kit (MET Only ~\$300)

Washington Engineering Institute

Academic Policy

Chapter 4

Grading System: The Instructor holds the sole authority to issue grades based on a 4.0 schedule as shown below. Grades are generally determined by a combination of attendance, assignments, exams, quizzes, projects, verbal questions, observed equipment skill competencies, tardiness, and/or classroom behavior to determine a grade.

4.0	A
3.7	A-
3.3	B+
3.0	B
2.7	B-
2.3	C+

2.0	C
1.7	C-
1.3	D+
1.0	D
0.7	D-
0.0	F

AU	Class audited with no grade or credit earned
CC	Course Challenge credit granted per policy
TR	Prior education credit granted per policy
INC	Incomplete – Instructor Allows Extra Time to Complete
W	Withdrawn from class

(AU) Auditing: No grade or credit is awarded for classes taken as an audit. Continuing education student typically take classes for audit credit only.

(CC) Course Challenge Credit: The Institute policy on challenging coursework is defined earlier in this Catalog.

(TR) Transfer Credit: The Institute policy on educational transfer credit is defined earlier in this Catalog.

(INC) Incomplete: The instructor may issue an incomplete grade for a course. It is the student's responsibility to complete the course by the end of the next following quarter. All incomplete grades will be replaced with the grade, as earned, at the end of the following quarter.

(W) Withdrawal: Assigned by the Registrar, based on a student's Request for Withdrawal (see page 13).

Lack of Attendance: A student who stops attending class and does not submit a Request for Withdrawal (see page 13) to the Registrar will receive the grade earned up to that point.

Credit System: The Institute conducts curriculum under a quarterly system and calculates course credit hours by using the following standard:

Course Activity	Hours	Credit
Lecture	10	1 Cr
Lab Work	20	1 Cr
External Work	40	1 Cr

Monthly Course Blocks: The Institute has organized its courses into course blocks. A course block is a focused course with many hours over a shorter duration. Students typically take one evening course at a time, as they work through the program. Typical course credit hours are calculated as follows:

Block	Credits
4 Weeks	4 CR
6 Weeks	5 CR

Automatic Registration: Enrolled degree program students are automatically registered for their next courses as shown on their degree plan. This eliminates the quarterly registration process paperwork and costs. Should a student be unable to attend the next automatically registered course, they will need to withdraw from the course per catalog policy.

Degree Planning: Enrolled degree program students will typically graduate under the degree requirements of the catalog they entered the program under. Your program advisor will prepare a degree plan to guide you through the program. Your degree plan will typically show completed courses marked in green and upcoming courses marked in yellow. Please work with your program advisor to keep your degree plan up to date.

Graduation Requirements – Associate of Applied Science: Graduating candidates must meet all of the following requirements:

1. Completion of all Freshman and Sophomore level coursework required by the degree program
2. Hold a minimum GPA of 2.0 at time of graduation

Graduation Requirements – Bachelor of Science: Graduating candidates must meet all of the following requirements:

1. Completion of an Associate's Degree in the prerequisite area of study
2. Completion of all Junior and Senior level coursework required by the degree program
3. Hold a minimum GPA of 2.0 at time of graduation

Program Coursework Changes: Enrolled degree program students typically graduate under the catalog volume coursework that they entered the degree program with. However, the degree programs are frequently updated to adapt to changing industry needs and the new curriculum is highly desirable to enrolled students. Therefore, students may end up graduating under a newer catalog volume's coursework.

Program Acceleration: It is possible to take extra courses and finish your degree early. You will need to work closely with your program advisor to adjust your degree program plan, as degree plans are paced for the typical student.

Part-Time Enrollment: It is possible to take less courses each quarter than the typical student schedule. You will need to work closely with your program advisor to adjust your degree program plan to accommodate a part-time schedule. Taking courses part-time will lengthen the time required to obtain a degree.

Course Prerequisites: Students must meet prerequisite requirements to be automatically registered for a course that has prerequisites. The course instructor may provide permission for a student to take the course without the required prerequisites.

Academic Status: Academic status is reviewed at the end of each quarter, to gauge student performance and ability to continue with a degree program. Status will be based on credits completed and quarterly and cumulative Grade Point Average (GPA).

Program Inactivity: Students must complete one course per quarter to remain active in a degree program. Students that have no activity for two quarters in a row shall be academically dismissed due to program inactivity. Exceptions may be granted for medical and work reasons by the Academic Director.

Academic Progress: Students shall maintain a quarterly GPA of at least 2.0. Students that fall below a 2.0 quarterly average shall be placed on academic probation for academic progress. A student on academic probation who falls below a 2.0 quarterly average for the next consecutive quarter shall be academically dismissed. Exceptions may be granted for medical and work reasons by the Academic Director.

Reinstatement: A student may appeal academic dismissal by writing a “request for reinstatement” letter to the Academic Director. The Academic Director has the sole authority to review submitted materials and to offer reinstatement.

Student Grievance: A student may appeal any action taken by faculty, staff, or administration with a written “statement of grievance” to the Academic Director, 1414 Meador Avenue Suite 104, Bellingham, WA 98229. The Academic Director has the sole authority to review submitted materials and determine grievance actions.

Absences, Tardiness, and Make-Up Work: Absences and tardiness may affect grades and can be made-up at the Instructor discretion. The Instructor may issue make-up coursework at their discretion. In all cases, it shall be the initiative of the student to make-up any missed work or lectures.

Request for Withdrawal: Students may officially withdraw from a course up until the midpoint of the course. The request must be submitted in writing or via email to the Registrar. A (W) grade will be noted on the student transcript. **NOTE:** A student who stops attending class and does not submit a Request for Withdrawal to the Registrar will receive the grade earned up to that point.

Transcripts Policy: An official final transcript is mailed with the completion of any degree program. Official and unofficial transcripts are provided to students upon email request to the registrar at jminer@weiedu.org.

Student Records: A student that is enrolled or has been enrolled may review educational records maintained by the college under the following policy.

Educational Records: Any record in whatever form including; handwritten, electronic, recorded, printed, filmed, or other mediums which are maintained by the college.

Staff Exception: Personal records kept in the sole possession of a college staff member may not be reviewed. A good example is the grade book of an instructor. The student may review the final grades submitted to the college by the instructor, but not the personal grade book of the instructor.

Student Rights: Students have the right to:

- Review the student's own educational records.
- Request that the student's educational records be amended to ensure the records are not inaccurate, misleading or otherwise in violation of a student's privacy.
- Consent to disclosure of personally identifiable information contained in the student's educational records.
- Obtain a copy of the college's Student Records Policy.

Procedure to Review Educational Records: Students will use the following process to access their records:

- Students may review their own educational records upon written request to the College's Academic Director. The request should identify as precisely as possible the record(s) the student wishes to review.
- Access will be provided within 10 working days of receipt of the written request.
- The college reserves the right to refuse to permit a student to review the following information:
 1. Letters of recommendation for which the student has waived his or her right of access.
 2. Records which are excluded from the above definition of educational records.
 3. Any records which contain information about other students.
- The College reserves the right to refuse to provide copies of records to students with outstanding financial obligations to the college or where there is an unresolved disciplinary action pending against the student.

Amendment of Educational Records: Students will use the following process to amend their records:

- A student must notify the college in writing of information in the student's educational record which the student believes is inaccurate, misleading or in violation of a student's privacy. Requests for grade changes are not included in this policy.
- If the college does not amend the student's record at the student's request, the student is entitled to a hearing with the College President. The decision of the College President will be considered final.

Disclosure of Educational Records: The College will disclose information contained in a student's educational records only with written consent of the student, with the following exceptions:

- To school officials, including teachers, who have a legitimate educational interest in the student records.
- To officials of a local, state or federal agency in connection with a student's request for financial assistance for college expenses from that agency.
- To federal, state and local agencies and authorities as provided by law.
- To comply with a judicial order or lawfully issued subpoena.
- In response to an emergency where the student or others are in immediate physical danger. Determination to disclose records under this provision will be made solely by the College President.

Disruptive Behavior: The Instructor has full authority to maintain control in the classroom in order to provide a positive learning environment. Disruptive behavior is defined as any action that negatively affects the classroom-learning environment.

Behavior Rising to the Level of Dismissal: Threats and any criminal activity are clear grounds for dismissal. In addition, disruptive behavior can rise to the level of dismissal. The Academic Director has full authority to determine dismissal. Class re-admission is possible, only with Academic Director permission.

Drug-Free Campus: In compliance with the Drug Free Workplace Act, the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in and on Institute controlled property. Any instructor or student determined to have violated this policy shall be subject to termination of employment or expulsion from the Institute.

Cheating, Plagiarism and Dishonesty : The Washington Engineering Institute maintains a high standard of academic integrity. Learning in a small, cohesive environment is based on trust, honesty and a common desire to develop applicable skills and knowledge in the field of engineering. In the event of cheating, plagiarism and academic dishonesty, the ability for the Institute to be a provider of education, and student learning is compromised.

The Oxford English Dictionary definition of **Cheating**: *To act dishonestly or unfairly in order to gain an advantage, especially in a game or examination.*

The Oxford English Dictionary definition of **Plagiarism**: *The practice of taking someone else's work and passing them off as one's own.*

Disciplinary Actions: In the event of cheating and plagiarizing the following disciplinary actions may be taken by the program instructor:

- 1) Review at which time, the Instructor may consult the Academic Director.
- 2) The Instructor may decide if the coursework, exam, or paper are required to be repeated.
- 3) The Instructor may determine if the exam, project, or paper grade be a zero (0).
- 4) The Instructor may determine if the final course grade should be a zero (0).
- 5) The Instructor may refer to the case to the Academic Director, who can, in collaboration with the Student Services Director and the Instructor, determine if probation, suspension, or expulsion is the best course of action.

Disciplinary Appeals: In the event of disciplinary action, expulsion, or suspension the student may appeal to the Academic Director in writing. The Academic Director has the sole authority to review submitted materials and determine appeal actions.

Distance Learning (none): The Institute **does not** provide distance learning courses. All courses are delivered by traditional classroom lectures, labs, and exams. Some instructors are recording their lectures for posting to the internet so students can study, review, and makeup lectures when sick. However, these recordings are a support function, not the primary delivery mode for the courses.

Financial Aid Services (None): The Institute does not provide financial aid services, so we can keep our tuition low with **minimal administration**. In addition, the Institute is not a Title IV school and **cannot receive government funding** of any kind. That being stated, the Institute's tuition is low and our courses are only offered at night for a reason. In short, our students work during the day, pay as they go, and avoid getting in debt as follows:

- ♦ **Self-Pay:** Most WEI students work during the day and pay for their own tuition. This is why all WEI classes are in the evening. Low tuition provides the opportunity for students to work and pay as they go.
- ♦ **Scholarships:** Program enrolled WEI students should consider putting some effort into obtaining career changing scholarships. Engineering is a good subject area to be in for scholarships.
- ♦ **Employer Tuition Reimbursement:** A small portion of our students have their tuition fully or partially paid for by their employer. Check with your employer, you may be surprised at how supportive they will be for you to gain technical job skills.
- ♦ **Paid Engineering Internships:** Students that have studied hard in their freshman and sophomore years, should have enough skills to test the engineering career waters with a paid internship. All of our classes are in the evenings so our students will be available during the day for internships.

Placement Services (None): The Institute does not provide job placement services. That being stated, the instructors, who are practicing professionals, do recommend impressive students to their peers in the industry. In addition, industry professionals take classes for continuing education purposes and student networking, mentoring, and internships are encouraged.

Book Store (None): The Institute **does not** provide a bookstore. There are plenty of office supply stores that can provide student supplies. In addition, course textbooks are available from the WEI library for check-out. **Textbook lending** from the WEI library **saves students thousands of dollars** over a bachelor's degree program.

Student Email (None): The Institute does not provide college email addresses for students. That being stated, students are required to obtain their own email account to use throughout their time at the Institute. A Gmail or Hotmail account will suffice, so long as the student acknowledges that important information between the school, including instructors and school administration, will be sent to that account.

Personal Laptop Required: The Institute does not provide a computer lab. All enrolled students are required to have a personal laptop so they can study anywhere and at anytime.

The good news is that laptop prices are reasonable. You should be able to get a good laptop for somewhere **between \$500 and \$800**. WEI recommends the following laptop specifications:

- 17" Screen with a full size keyboard
- Windows 7 (best) or Windows 8 (acceptable)
- Dedicated Video Card
- Fast 7200rpm or Solid State Drive

Personal Software Required: All of the degree programs require students to purchase Microsoft Office to conduct the coursework. In addition, the Mechanical program requires students to purchase the student version of Solidworks and Rhino to conduct their coursework. Other coursework software can be downloaded for free including; AutoCAD, Civil 3D, Inventor, and Revit.

Industry Equipment Use: Some of the Institute courses utilize equipment borrowed from local industry. A good example is Construction GPS or Surveying Equipment. Thanks to the generosity of local industry we have access to this equipment. Therefore, students and faculty must take great care with the borrowed equipment so as to ensure future courses have access to the equipment.

Student ID Numbers (SID): Each student is issued a unique student ID number. This number is used on school paperwork to avoid use of the social security numbers. Students should always use their student ID number instead of social security numbers on required school documents.

Institute Catalog: The Institute has the following policies relating to the catalog.

Reduction of Paper Waste: The Washington Engineering Institute is committed to reducing paper waste in the environment. Therefore, we have made the green commitment not to send out course schedules or catalogs by bulk mail. Instead, a limited number of course schedules and catalogs will be printed for internal and advising table use.

Online Catalog Availability: Marketing efforts will direct candidate students to our online catalog and course schedules. The catalog and course schedules will be available for viewing or download in PDF format on the Institute website: www.weiedu.org. Alternatively, any employee can provide a digital copy of the catalog in PDF format by email.

Individual Hardcopies on Request: On occasion, candidates or agencies may request a catalog or course schedule in hardcopy format. Individual hardcopies will be provided free of cost by mail on request.

Catalog Changes and Approvals: The Academic Director shall approve all changes to the Institute's Catalog prior to issuance. The Catalog shall have the volume number and date of publication clearly printed on the front page. The Catalog shall have contact information printed in the footer of every page.

Student Evaluations of Faculty: Student evaluations of faculty shall be conducted quarterly or by course. The typical evaluation process is as follows:

- 1) The instructor shall designate one student as the evaluation lead and provide them blank evaluation forms and a large envelope.
- 2) The instructor shall leave the classroom while the students fill out their evaluation forms.
- 3) The student evaluation lead shall collect the evaluations, place them in the envelope, seal the envelope, and submit the sealed envelope to the Academic Director.
- 4) The Academic Director will then review and compile the evaluations.
- 5) The Academic Director may then meet with the instructor, provide a compiled evaluation, and/or discuss the results.
- 6) The Academic Director may use the evaluations for corrective actions or use them for positive recognition.

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Katherine I. Bren, MSE, EIT <i>Engineering and Mathematics Instructor</i> kbren@weiedu.org EIT, Washington State Master of Science Engineering Bachelor of Science Industrial Engineering	Craig Lang <i>English Instructor</i> craiglangcreative@gmail.com Bachelor of Arts in English WSAC Teaching Waiver
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<p>Sam Shipp, PE <i>Engineering Instructor</i> sshipp@weiedu.org Bachelor of Science in Civil Engineering WSAC Teaching Waiver</p>	<p>Doug Zaugg, BFA <i>Engineering Technology Instructor</i> dzaugg@weiedu.org Bachelor of Fine Arts in Industrial Science WSAC Teaching Waiver</p>

Washington Engineering Institute

Programs of Study

Chapter 8

**(BS) Bachelor of
Science Degrees**

**(AAS) Associate of
Applied Science
Degrees**

Civil Engineering Technology



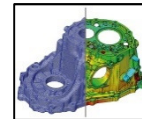
Mechanical Engineering Technology



**Degree Minors &
Continuing Education
Coursework**



**Architectural
Engineering**



**Manufacturing
& Metrology
Engineering**



**Construction
Management**



**Process
Engineering**



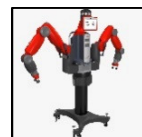
**Environmental
& Agricultural
Engineering**



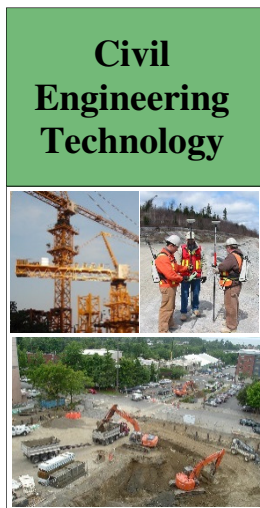
**Renewable
Energy
Engineering**



**Land
Surveying**



**Robotics
Engineering**



Program Objective: The Civil Engineering Technology Bachelor of Science degree prepares graduates to work as design engineers or engineering technologists. This program includes all of the hands-on technical skills coursework of the associate's degree program, along with two years of calculus level mathematics, statics, dynamics, and engineering physics curriculum.

Typical Career Paths: The Bachelor of Science program prepares students to work at the design engineer and engineering technologist level with typical job titles including the following:

- Civil Engineering Designer
- Construction Manager
- Engineering Manager
- Public Works Director
- Construction Estimator, Planner, or Scheduler
- Construction Engineer
- Engineering Technician
- Civil Drafter
- Civil Designer
- Stormwater Technician
- Erosion Control Inspector
- Permit Specialist
- Materials Inspector/Tester
- Construction Inspector
- Public Works Inspector

Program Outcomes: Graduates of the baccalaureate degree program must demonstrate knowledge and technical competency, appropriate to the objectives of the program, to:

- a. Utilize principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;
- b. Conduct standardized field and laboratory tests related to civil engineering;
- c. Utilize surveying methods appropriate for land measurement and/or construction layout;
- d. Apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to civil engineering;
- e. Plan and prepare documents appropriate for design and construction;
- f. Perform economic analyses and cost estimates related to design, construction, operations and maintenance of systems associated with civil engineering;
- g. Select appropriate engineering materials and practices, and; Perform standard analysis and design in at least three sub-disciplines related to civil engineering.


Freshman	Fall	CIVE 101	Civil Engineering Fundamentals	4
		CIVE 111	Civil 3D Level 1 – Plan and Profile	4
		HCON 122	Earthmoving Fundamentals	4
		MATH 131	Engineering Math – Algebra 1	4
	Winter	CIVE 112	Civil 3D Level 2 – Utilities and Intersections	4
		COMP 151	Spreadsheets for Engineering Modeling	4
		MATH 132	Engineering Math – Algebra 2	4
Spring	CIVE 113	Civil 3D Level 3 – Advanced Grading	4	
	MATH 133	Engineering Math – Trigonometry 1	4	
	PHYS 121	Introduction to Physics	4	
Summer	SURV 132	Topographic Land Surveying	4	
	SURV 134	Construction Land Surveying	4	
Sophomore	Fall	CIVE 201	Roadway Design	4
		ENGL 205	Technical Writing	4
		MATH 231	Engineering Math – Trigonometry 2	4
			Design Elective 1	4
	Winter	CIVE 202	Storm System Design	4
		MATH 232	Engineering Math – MathCAD	4
			Design Elective 2	4
	Spring	CIVE 203	Water System Design	4
		CIVE 221	Statics for Building Construction	4
		CMST 210	Workplace Communications	4
Summer	CIVE 222	Civil Engineering Materials	4	
	SURV 231	Control Network Land Surveying	4	
Fall	MATH 233	Engineering Math – Calculus Preparatory	4	
	Associate of Applied Science Complete			100
Junior	Fall	PHYS 301	Applied Engineering Physics 1	5
	Winter	MATH 301	Engineering Math – Calculus 1	5
		PHYS 302	Applied Engineering Physics 2	5
	Spring	MATH 302	Engineering Math – Calculus 1	5
		PHYS 303	Applied Engineering Physics 3	5
Summer	COMP 301	C for Engineers	5	
		Engineering Elective 1	5	
Senior	Fall	ENGL 301	Proposals and Grant Writing	5
		ENGR 401	Engineering Mechanics – Statics 1	5
		MATH 303	Engineering Math – Calculus 3	5
	Winter	ENGR 402	Engineering Mechanics – Statics 2	5
		MATH 401	Engineering Math – Linear Algebra	5
	Spring	ENGR 403	Engineering Mechanics – Dynamics 1	5
			Engineering Elective 2	5
	Summer	ECON 401	Engineering Economics	5
		Engineering Elective 3	5	
Fall	HCON 421	Contracts and Construction Law	5	
		Engineering Elective 4	5	
	Bachelor of Science Complete			190


Sophomore Year Design Electives: The Sophomore design electives are typically 200 level courses taken from any elective area of interest. Students are encouraged to focus their electives into one area of interest to earn a degree minor in that area.


Junior/Senior Year Engineering Electives: The Junior/Senior engineering electives are typically 400 level courses taken from any elective area of interest. It may be necessary to take 200 level design electives in place of 400 level engineering electives, due to prerequisite requirements or a desire to explore a different area of interest. This is acceptable for electives, provided that any credit differences are made up with additional elective coursework. Students are encouraged to focus their electives into one area of interest to earn a degree minor in that area.


Degree Minor Option: The Bachelor of Science in Civil Engineering Technology program offers several degree minors. A minor is optional. A minor requires the completion of coursework in a secondary but related field of study from the Bachelor's degree major. The award of a Minor is subject to the following conditions:


- ◆ Minors are only available to Bachelor's Degree students.
- ◆ Minors are noted on a student's degree diploma.
- ◆ Minors are noted on a student's transcript.
- ◆ A Minor requires the completion of (27) or more credits in courses from a listed Minor.
- ◆ A cumulative 2.0 GPA is required for Minor courses.
- ◆ Minor courses require a minimum of (8) students to run.

Architectural Engineering Minor Electives (ARCH)				
ARCH	211	4CR	Revit Architecture	
ARCH	212	4CR	Revit MEP	
ARCH	213	4CR	Navisworks	
ARCH	401	5CR	Architectural Design 1	
ARCH	402	5CR	Architectural Design 2	
ARCH	403	5CR	Architectural Design 3	
The Architectural Engineering Minor coursework under the Civil Engineering program is focused on building design, building information modeling (BIM), and structural analysis.				

Construction Management Minor Electives (HCON)				
HCON	201	4CR	Construction Estimation	
HCON	202	4CR	Construction Scheduling	
HCON	221	4CR	Construction Business & Financing	
HCON	421	5CR	Contracts and Construction Law	
HCON	422	5CR	Construction Project Controls	
HCON	423	5CR	Construction Resource Accounting	
The Construction Management Minor coursework under the Civil Engineering program is focused on heavy civil construction estimation, scheduling, project controls, resource accounting, contracts, law, and business financials.				

Environmental & Agricultural Engineering Minor (ENVR)				
ENVR	201	4CR	Agromony 1 – Soils Science	
ENVR	202	4CR	Agromony 2 – Crop Science	
ENVR	221	4CR	Wetlands	
ENVR	401	5CR	Irrigation and Water Rights	
SURV	401	5CR	GPS Machine Control	
SURV	402	5CR	Drone/UAV Site Surveying	
The Environmental and Agricultural Engineering Minor coursework under the Civil Engineering program is focused on soils care, crops, irrigation, crop protection, automated GPS harvesting, wetlands mapping, and Drone/UAV Site Surveying applications.				

Land Surveying Minor (SURV)				
SURV	221	4CR	Boundary Law	
SURV	222	4CR	Advance Legal Descriptions	
SURV	223	4CR	Public Lands	
SURV	401	5CR	GPS Machine Control	
SURV	402	5CR	Drone/UAV Site Surveying	
SURV	421	5CR	Land Surveying Computations	
The Land Surveying Minor coursework under the Civil Engineering program is focused on the career and profession of land surveying including; history, computations, adjustments, law, drone site surveying, and machine automation.				

Renewable Energy Engineering Minor (RENG)				
RENG	201	4CR	Solar Power Fundamentals	
RENG	211	4CR	Wind Power Fundamentals	
RENG	221	4CR	Hydro Power Fundamentals	
RENG	401	5CR	Power Design 1 - Site Analysis	
RENG	402	5CR	Power Design 2 - Testing	
RENG	403	5CR	Power Design Project	
The Renewable Energy Engineering Minor coursework under the Civil or Mechanical Engineering program is focused on Hydro Power and Windpower site analysis, testing, experiments, analysis, and project design.				

Civil Engineering Technology



Program Objective: The Civil Engineering Technology Associate of Applied Science degree prepares graduates to work as engineering technicians. The program focuses on software and equipment job skills required for careers in government agencies and the private Civil Engineering Industry. Hands-on coursework includes field surveying, two years of CADD design, GIS mapping, permitting, and heavy construction fundamentals.

Typical Career Paths: The associate of science program prepares students to work at the engineering technician level with typical job titles including the following:

- Engineering Technician
- Civil Drafter
- Civil Designer
- Stormwater Technician
- Erosion Control Inspector
- Permit Specialist
- Materials Inspector/Tester
- Construction Inspector
- Public Works Inspector

Program Outcomes: Graduates of the baccalaureate degree program must demonstrate knowledge and technical competency, appropriate to the objectives of the program, to:

- a. Utilize principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;
- b. Conduct standardized field and laboratory tests related to civil engineering;
- c. Utilize surveying methods appropriate for land measurement and/or construction layout;
- d. Apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to civil engineering.

Freshman	Fall	CIVE 101	Civil Engineering Fundamentals	4
		CIVE 111	Civil 3D Level 1 – Plan and Profile	4
		HCON 122	Earthmoving Fundamentals	4
		MATH 131	Engineering Math – Algebra 1	4
	Winter	CIVE 112	Civil 3D Level 2 – Utilities and Intersections	4
		COMP 151	Spreadsheets for Engineering Modeling	4
		MATH 132	Engineering Math – Algebra 2	4
Spring	CIVE 113	Civil 3D Level 3 – Advanced Grading	4	
	MATH 133	Engineering Math – Trigonometry 1	4	
	PHYS 121	Introduction to Physics	4	
Summer	SURV 132	Topographic Land Surveying	4	
	SURV 134	Construction Land Surveying	4	
Sophomore	Fall	CIVE 201	Roadway Design	4
		ENGL 205	Technical Writing	4
		MATH 231	Engineering Math – Trigonometry 2	4
			Design Elective 1	4
	Winter	CIVE 202	Storm System Design	4
		MATH 232	Engineering Math – MathCAD	4
			Design Elective 2	4
	Spring	CIVE 203	Water System Design	4
		CIVE 221	Statics for Building Construction	4
		CMST 210	Workplace Communications	4
Summer	CIVE 222	Civil Engineering Materials	4	
	SURV 231	Control Network Land Surveying	4	
Fall	MATH 233	Engineering Math – Calculus Preparatory	4	
Associate of Applied Science Complete				100

Mechanical Engineering Technology

MET

Bachelor of Science

BS

Mechanical Engineering Technology



Process
Piping &
Aero/
Auto/Wind
Manufacturing

Program Objective: The baccalaureate degree program in Mechanical Engineering Technology will prepare graduates with knowledge, problem solving ability, and hands-on skills to enter careers in the design, installation, manufacturing, testing, evaluation, or maintenance of mechanical systems. Graduates of the baccalaureate degree program have strengths in the analysis, applied design, development, implementation, or oversight of more advanced mechanical systems and processes.

The Mechanical Engineering Technology discipline encompasses the areas of computer-aided drafting/design, manufacturing, analysis of engineering data, machine/mechanical design/analysis, conventional or alternative energy system design/analysis, maintenance, and heating, ventilation, and air conditioning (HVAC).

Typical Career Paths: The Bachelor of Science program prepares students to work at the design engineer or engineering technologist level with typical job titles including the following:

- Process Engineer
- Industrial Engineer
- Manufacturing Designer
- Manufacturing Technologist
- Engineering Technologist
- Manufacturing Supervisor
- Production Supervisor
- Engineering Technician
- Manufacturing Technician
- Process Technician
- CADD Drafter
- CADD Designer
- 3D Printing Technician
- CNC Machine Technician

Program Outcomes: Graduates of the baccalaureate degree program must demonstrate knowledge and technical competency, appropriate to the objectives of the program, to:

- a. The ability to apply specific program principles to the specification, installation, fabrication, testing, operation, maintenance, sales, or documentation of basic mechanical systems.
- b. Have an understanding of engineering materials, applied mechanics, and manufacturing methods
- c. The ability to computer-aided draft emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and basic computer aided drafting and design with technical depth in at least one of these areas
- d. Have an understanding of the application of physics and engineering materials having an emphasis in applied mechanics, or in-depth application of physics having emphasis in mechanical components and design.
- e. The ability to apply specific program principles to analysis, design, development, implementation, or oversight of more advanced mechanical systems or processes.
- f. The ability to design machine elements, advanced drafting including current three dimensional computer representations as related to mechanical design, and manufacturing methods. Advanced proficiency must be demonstrated in at least three drafting / design related areas, consistent with the technical orientation of the program.
- g. Have an understanding of the in-depth application of physics and engineering materials having emphasis in drafting, manufacturing, and design of mechanical components


Freshman	Fall	MATH 131	Engineering Math – Algebra 1	4
		MECH 101	Mechanical Engineering Careers	4
		MECH 111	Solidworks Mechanical Design Level 1	4
		MECH 131	Rhino Modeling and 3D Printing	4
	Winter	COMP 151	Spreadsheets for Engineering Modeling	4
		MATH 132	Engineering Math – Algebra 2	4
		MECH 112	Solidworks Mechanical Design Level 2	4
	Spring	MATH 133	Engineering Math – Trigonometry 1	4
		MECH 113	Solidworks Mechanical Design Level 3	4
		PHYS 121	Introduction to Physics	4
	Summer	MECH 121	Fabrication and Welding Lab 1	4
		MECH 122	Fabrication and Welding Lab 2	4
Sophomore	Fall	ENGL 205	Technical Writing	4
		MATH 231	Engineering Math – Trigonometry 2	4
		MECH 201	Metrology 1	4
			Design Elective 1	4
	Winter	MATH 232	Engineering Math – MathCAD	4
		MECH 202	3D Laser Scanning	4
			Design Elective 2	4
	Spring	CMST 210	Workplace Communications	4
		MECH 221	Applied Mechanics for Engineering Technology	4
			Design Elective 3	4
	Summer	MECH 222	Materials Science 1	4
		MECH 203	CNC Programming	4
	Fall	MATH 233	Engineering Math – Calculus Preparatory	4
Associate of Applied Science Complete				100
Junior	Fall	PHYS 301	Applied Engineering Physics 1	5
	Winter	MATH 301	Engineering Math – Calculus 1	5
		PHYS 302	Applied Engineering Physics 2	5
	Spring	MATH 302	Engineering Math – Calculus 2	5
		PHYS 303	Applied Engineering Physics 3	5
	Summer	COMP 301	C for Engineers	5
			Engineering Elective 1	5
Senior	Fall	ENGL 301	Proposals and Grant Writing	5
		ENGR 401	Engineering Mechanics – Statics 1	5
		MATH 303	Engineering Math – Calculus 3	5
	Winter	ENGR 402	Engineering Mechanics – Statics 2	5
		MATH 401	Engineering Math – Linear Algebra	5
	Spring	ENGR 403	Engineering Mechanics – Dynamics 1	5
			Engineering Elective 2	5
	Summer	ECON 401	Engineering Economics	5
			Engineering Elective 3	5
	Fall	INDE 401	Probability and Statistics Engineering	5
			Engineering Elective 4	5
Bachelor of Science Complete				190


Sophomore Year Design Electives: The Sophomore design electives are typically 200 level courses taken from any elective area of interest. Students are encouraged to focus their electives into one area of interest to earn a degree minor in that area.


Junior/Senior Year Engineering Electives: The Junior/Senior engineering electives are typically 400 level courses taken from any elective area of interest. It may be necessary to take 200 level design electives in place of 400 level engineering electives, due to prerequisite requirements or a desire to explore a different area of interest. This is acceptable for electives, provided that any credit differences are made up with additional elective coursework. Students are encouraged to focus their electives into one area of interest to earn a degree minor in that area.


Degree Minor Option: The Bachelor of Science in Mechanical Engineering Technology program offers several degree minors. A minor is optional. A minor requires the completion of coursework in a secondary but related field of study from the Bachelor's degree major. The award of a Minor is subject to the following conditions:


- ◆ Minors are only available to Bachelor's Degree students.
- ◆ Minors are noted on a student's degree diploma.
- ◆ Minors are noted on a student's transcript.
- ◆ A Minor requires the completion of (27) or more credits in courses from a listed Minor.
- ◆ A cumulative 2.0 GPA is required for Minor courses.
- ◆ Minor courses require a minimum of (8) students to run.

Process Engineering Minor (PROE)				
PROE	201	4CR	Food Processing Design 1 - Conversion	
PROE	202	4CR	Food Processing Design 2 - Preservation	
PROE	203	4CR	Food Processing Project	
PROE	401	5CR	Process Simulation	
INDE	451	5CR	Plant Layout and Materials Handling	
INDE	452	5CR	Engineering Quality Control	
The Process Engineering Minor coursework under the Mechanical Engineering program is focused on food processing, simulation, plant layout, materials handling, quality control, and other agricultural processing applications.				

Renewable Energy Engineering Minor (RENG)				
RENG	201	4CR	Solar Power Fundamentals	
RENG	211	4CR	Wind Power Fundamentals	
RENG	221	4CR	Hydro Power Fundamentals	
RENG	401	5CR	Power Design 1 - Site Analysis	
RENG	402	5CR	Power Design 2 - Testing	
RENG	403	5CR	Power Design Project	
The Renewable Energy Engineering Minor coursework under the Mechanical Engineering program is focused on Hydro Power and Windpower site analysis, testing, experiments, analysis, and project design.				

Manufacturing and Metrology Engineering Minor (MANF)				
INDE	201	4CR	Manufacturing Methods & Standards	
MANF	201	4CR	Geometric Dimensioning & Tolerancing	
MANF	202	4CR	Advanced Metrology	
MANF	401	5CR	Reverse Engineering	
INDE	451	5CR	Plan Layout and Materials Handling	
INDE	452	5CR	Engineering Quality Control	
The Metrology Engineering Minor coursework under the Mechanical Engineering program is focused on manufacturing measurements, industrial scanning, reverse engineering designs from scans, quality control, and production management systems.				

Robotics Engineering Minor (ROBO)				
ROBO	201	4CR	Robotics Engineering Fundamentals	
ROBO	202	4CR	Python Programming for Robotics	
ROBO	203	4CR	Programmable Logic Controllers	
ROBO	401	5CR	Robotics Engineering 1	
ROBO	402	5CR	Robotics Engineering 2	
ROBO	403	5CR	Robotics Engineering 3	
The Robotics Engineering Minor coursework under the Mechanical Engineering program is focused on robotics in manufacturing, robotic design, robotic control, instrumentation, and robotic programming.				

Architectural Engineering Minor (ARCH)				
ARCH	211	4CR	Revit Architecture	
ARCH	212	4CR	Revit MEP	
ARCH	213	4CR	Navisworks	
ARCH	401	5CR	Architectural Design 1	
ARCH	402	5CR	Architectural Design 2	
ARCH	403	5CR	Architectural Design 3	
The Architectural Engineering Minor coursework under the Civil Engineering program is focused on building design, building information modeling (BIM), and structural analysis.				

Mechanical Engineering Technology



Process Piping & Aero/ Auto/Wind Manufacturing

Program Objective: The Mechanical Engineering Technology associate degree program prepares graduates with knowledge, problem solving ability, and hands-on skills to enter careers in the design, installation, manufacturing, testing, evaluation, or maintenance of mechanical systems. Graduates of the associate degree program have strengths in specifying, installing, fabricating, testing, documenting, operating, selling, or maintaining basic mechanical systems.

The Mechanical Engineering Technology discipline encompasses the areas of computer-aided drafting/design, manufacturing, analysis of engineering data, machine/mechanical design/analysis, conventional or alternative energy system design/analysis, maintenance, and heating, ventilation, and air conditioning (HVAC).

Typical Career Paths: The associate of applied science program prepares students to work at the engineering technician level with typical job titles including the following:

- Engineering Technician
- Manufacturing Technician
- Process Technician
- CADD Drafter
- CADD Designer
- 3D Printing Technician
- CNC Machine Technician

Program Outcomes: Graduates of the associate degree program must demonstrate knowledge and technical competency, appropriate to the objectives of the program, to:

- a. The ability to apply specific program principles to the specification, installation, fabrication, testing, operation, maintenance, sales, or documentation of basic mechanical systems.
- b. Have an understanding of engineering materials, applied mechanics, and manufacturing methods
- c. The ability to computer-aided draft emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and basic computer aided drafting and design with technical depth in at least one of these areas
- d. Have an understanding of the application of physics and engineering materials having an emphasis in applied mechanics, or in-depth application of physics having emphasis in mechanical components and design.

Freshman	Fall	MATH 131	Engineering Math – Algebra 1	4
		MECH 101	Mechanical Engineering Careers	4
		MECH 111	Solidworks Mechanical Design Level 1	4
		MECH 131	Rhino Modeling and 3D Printing	4
	Winter	COMP 151	Spreadsheets for Engineering Modeling	4
		MATH 132	Engineering Math – Algebra 2	4
		MECH 112	Solidworks Mechanical Design Level 2	4
	Spring	MATH 133	Engineering Math – Trigonometry 1	4
		MECH 113	Solidworks Mechanical Design Level 3	4
		PHYS 121	Introduction to Physics	4
	Summer	MECH 121	Welding and Fabrication Lab 1	4
		MECH 122	Welding and Fabrication Lab 2	4
Sophomore	Fall	ENGL 205	Technical Writing	4
		MATH 231	Engineering Math – Trigonometry 2	4
		MECH 201	Metrology 1	4
			Design Elective 1	4
	Winter	MATH 232	Engineering Math – MathCAD	4
		MECH 202	3D Laser Scanning	4
			Design Elective 2	4
	Spring	CMST 210	Workplace Communications	4
		MECH 221	Applied Mechanics for Engineering Technology	4
			Design Elective 3	4
	Summer	MECH 222	Materials Science 1	4
		MECH 203	CNC Programming	4
	Fall	MATH 233	Engineering Math – Calculus Preparatory	4
		Associate of Applied Science Complete		


Continuing Education


Professional Technical Certificate


Professional technical coursework is greatly desired in the industry. In some cases professionals must take continuing education coursework to maintain their state licensing. In other cases, employers wish to train or modernize their employee's software, hardware, and technical skills. In many cases individuals just want to improve their existing skills to stay ahead at work.


Professional Technical Certificate: These programs of study are intended to provide professional technical continuing education for those already working in the industry, who desire to improve their skills or gain new skills.


- ◆ **Program Prerequisite:** Must be working in the Architecture, Engineering, Manufacturing, or Construction (AEC) industry or by instructor permission.
- ◆ A certificate requires the completion of all listed courses.
- ◆ A cumulative 2.0 GPA is required for the listed certificate courses.
- ◆ Certificate courses require a minimum of (8) students to run.

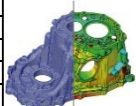
Architectural Engineering (ARCH)				
ARCH	211	4CR	Revit Architecture	
ARCH	212	4CR	Revit MEP	
ARCH	213	4CR	Navisworks	
ARCH	401	5CR	Architectural Design 1	
ARCH	402	5CR	Architectural Design 2	
ARCH	403	5CR	Architectural Design 3	
The Architectural Engineering Certificate is focused on building design, building information modeling (BIM), and structural analysis for those who are already working in the industry.				


Construction Management (HCON)				
HCON	201	4CR	Construction Estimation	
HCON	202	4CR	Construction Scheduling	
HCON	221	4CR	Construction Business & Financing	
HCON	421	5CR	Contracts and Construction Law	
HCON	422	5CR	Construction Project Controls	
HCON	423	5CR	Construction Resource Accounting	
The Construction Management Minor coursework under the Civil Engineering program is focused on heavy civil construction estimation, scheduling, project controls, resource accounting, contracts, law, and business financials.				


Environmental & Agricultural Engineering (ENVR)				
ENVR	201	4CR	Agronomy 1 – Soils Science	
ENVR	202	4CR	Agronomy 2 – Crop Science	
ENVR	221	4CR	Wetlands	
ENVR	401	5CR	Irrigation and Water Rights	
SURV	401	5CR	GPS Machine Control	
SURV	402	5CR	Drone/UAV Site Surveying	
The Environmental and Agricultural Engineering Minor coursework under the Civil Engineering program is focused on soils care, crops, irrigation, crop protection, automated GPS harvesting, wetlands mapping, and Drone/UAV Site Surveying applications.				

Land Surveying (SURV)				
SURV	221	4CR	Boundary Law	
SURV	222	4CR	Advance Legal Descriptions	
SURV	223	4CR	Public Lands	
SURV	401	5CR	GPS Machine Control	
SURV	402	5CR	Drone/UAV Site Surveying	
SURV	421	5CR	Land Surveying Computations	
The Land Surveying Minor coursework under the Civil Engineering program is focused on the career and profession of land surveying including; history, computations, adjustments, law, drone site surveying, and machine automation. It should be noted that the coursework is in addition to the (3) basic land surveying courses that are already required during the freshman and sophomore years of the Bachelor's degree program.				

Process Engineering (PROE)			
PROE	201	4CR	Food Processing Design 1 - Conversion
PROE	202	4CR	Food Processing Design 2 - Preservation
PROE	203	4CR	Food Processing Project
PROE	401	5CR	Process Simulation
INDE	451	5CR	Plant Layout and Materials Handling
INDE	452	5CR	Engineering Quality Control
 <p>The Process Engineering Minor coursework under the Mechanical Engineering program is focused on food processing, simulation, plant layout, materials handling, quality control, and other agricultural processing applications.</p>			

Manufacturing and Metrology Engineering (MANF)			
INDE	201	4CR	Manufacturing Methods & Standards
MANF	201	4CR	Geometric Dimensioning & Tolerancing
MANF	202	4CR	Advanced Metrology
MANF	401	5CR	Reverse Engineering
INDE	451	5CR	Plant Layout and Materials Handling
INDE	452	5CR	Engineering Quality Control
 <p>The Metrology Engineering Minor coursework under the Mechanical Engineering program is focused on manufacturing measurements, industrial scanning, reverse engineering designs from scans, quality control, and production management systems.</p>			

Renewable Energy Engineering (RENG)			
RENG	201	4CR	Solar Power Fundamentals
RENG	211	4CR	Wind Power Fundamentals
RENG	221	4CR	Hydro Power Fundamentals
RENG	401	5CR	Power Design 1 - Site Analysis
RENG	402	5CR	Power Design 2 - Testing
RENG	403	5CR	Power Design Project
 <p>The Renewable Energy Engineering Minor coursework under the Mechanical Engineering program is focused on Hydro Power and Windpower site analysis, testing, experiments, analysis, and project design.</p>			

Robotics Engineering (ROBO)			
ROBO	201	4CR	Robotics Engineering Fundamentals
ROBO	202	4CR	Python Programming for Robotics
ROBO	203	4CR	Programmable Logic Controllers
ROBO	401	5CR	Robotics Engineering 1
ROBO	402	5CR	Robotics Engineering 2
ROBO	403	5CR	Robotics Engineering 3
 <p>The Robotics Engineering Minor coursework under the Mechanical Engineering program is focused on robotics in manufacturing, robotic design, robotic control, instrumentation, and robotic programming.</p>			

Washington Engineering Institute

Course Descriptions

Chapter 9

ARCH 211 4CR

Revit Architecture

This class is a practical hands-on experience. Students will work through a house design project from beginning to end using the Revit Architecture software, showing many different methods of using the software to accomplish certain tasks and solve problems along the way. Course topics include BIM, Level, Grids, Doors, Windows, Floors, Sections, Roofs, Interiors, and Construction Drawings.

Prerequisites: CADD 111

ARCH 212 4CR

Revit MEP

This class is a practical hands-on experience. Students will work through the mechanical, electrical, and piping design of a small commercial office building project using the Revit MEP software. Course topics include mechanical equipment, diffuser, duct system layout and sizing, electric system layout, light fixtures, receptacles, circuit panel board, sanitary system, domestic water system, and Construction Drawings.

Prerequisites: ARCH 211

ARCH 213 4CR

Navisworks

This class is a practical hands-on experience. Students will work through the formation of a composite project model with data from civil, architectural, mechanical, electrical, and piping CADD models. Course topics include merging file types, viewpoints, model markups, finding objects, adding links to objects, sorting, grouping, clash testing, timeline, material takeoffs, custom animations, and a final presentation project.

Prerequisites: ARCH 212

ARCH 401 5CR

Architectural Design 1

This course is the first in a series of three courses covering the fundamentals of Architecture design. Course one topics include: architectural careers, building construction process, sketching with Sketchup, Site Planning, Site Orientation, Site Plan Layout, Floor Plans with an overview of Mechanical, Electrical, and Plumbing (MEP) planning.

Prerequisites: ARCH 211

ARCH 402 5CR

Architectural Design 2

This course is the second in a series of three courses covering the fundamentals of Architecture design. Course two topics include: Roof plans, Elevations, Framing Methods, and Framing Plans.

Prerequisites: ARCH 401

ARCH 403 5CR

Architectural Design 3

This course is the third in a series of three courses covering the fundamentals of Architectural design. Course three topics include: Foundation plans, Wall Sections, Stairs, Commercial Design, Presentation and Renderings.

Prerequisites: ARCH 402

CADD 111 4 CR

AutoCAD 2D Drawings

This is an entry-level CAD class focused on the 2D use of the AutoCAD software. Students will learn 2D drawing fundamentals by conducting Engineering and Land Surveying applications. Course material coverage includes points, lines, layers, osnaps, properties, text, blocks, paperspace, polylines, and basic dimensioning.

Prerequisites: NONE

CADD 112 4 CR

AutoCAD 3D Drawings

This is an intermediate level CAD course. Students will learn 3D drawing with AutoCAD software by conducting various projects. Course topics include: 3D wireframe modeling, 3D face surface modeling, 3D solid modeling, rendering, customization of PGP/LIN files, and customization of toolbars, and new toolbar button editing using script language.

Prerequisites: CADD 111

CAD 113 4 CR

Geometric Dimensioning & Tolerancing

This is an intermediate level CAD course. Students will learn Geometric Dimensioning and Tolerancing (GD&T) standards using AutoCAD software by conducting various projects.

Prerequisites: CADD 111

CIVE 101 4 CR

Civil Engineering Fundamentals

This class provides an introduction to the Civil Engineering and Land Surveying careers. Students will learn about the site survey, civil design, construction survey, construction inspection, and asbuilt survey process for development and public works projects. Career areas discussed include field inspector, party chief, chainman, COGO technician, civil engineering technician, surveying technician, civil designer, civil engineer in training, civil engineer, land surveyor in training, and land surveyor. Students will learn about the RCW/WAC regulations that govern the profession. **Prerequisites:** NONE

CIVE 201 4 CR

Roadway Design

This class provides the fundamentals of road design. This course focuses on horizontal and vertical geometry and their associated calculations. This course includes background material on functional classifications, road sections, horizontal and vertical curvature, sight distance, superelevation, residential roadway design, pavement design, traffic theory, traffic safety and intersection design. **Prerequisites:** MATH 133

CIVE 202 4 CR**Storm System Design**

This class provides the fundamentals of storm water design and modeling. This course focuses on conveyance, treatment, detention, and infiltration design utilizing storm water modeling software. The course includes the preparation of a storm water report for a civil engineering project.

Prerequisites: MATH 133

CIVE 203 4 CR**Water System Design**

This class provides the fundamentals of pressurized public water systems design and modeling. This course focuses on conveyance, pressure, pumping, pressure reduction, and system losses design utilizing water system modeling software. The course includes the preparation of a water system report for a civil engineering design project.

Prerequisites: MATH133

CIVE 111 4 CR**Civil 3D Level 1 – Plan and Profile**

This class is a practical hands-on experience. Students will work through a basic road design project from beginning to end using Civil 3D, showing many different methods of using Civil 3D to accomplish certain tasks and solve problems along the way. The class covers the basics of basemap preparation, preliminary layout, survey plan, surfaces generation, horizontal alignments, profiles, corridor modeling, and grading.

Prerequisites: CADD 111

CIVE 112 4 CR**Civil 3D Level 2 –
Utilities and Intersections**

This class is a practical hands-on experience. Students will work through an advanced Civil 3D project, showing many different methods of using Civil 3D to accomplish certain tasks and solve problems along the way. The course covers advanced elements of horizontal and vertical alignments, corridor modeling, plan production tools, pipe design tools, grading tools, data shortcuts and Autodesk Vault project management tools. **Prerequisites:** CIVE 211

CIVE 113 4 CR**Civil 3D Level 3 – Advanced Grading**

This class is a practical hands-on experience. Students will work through an advanced Civil 3D grading project. The course covers parking lot grading, pond grading, road grading, detailed TIN and edge editing, composite surface grading, and Google earth surfaces.

Prerequisites: CIVE 211

CIVE 221 4 CR**Statics for Building Construction**

This class provides a fundamental introduction to engineering mechanics for rigid structures in equilibrium with building construction applications. This statics course is limited to trigonometric and algebra level calculations (no calculus). The intent is to provide associate's level students with the ability to determine forces and stresses in elementary structural systems.

Prerequisites: PHYS 121

CIVE 222 4 CR**Civil Engineering Materials Lab**

This course provides an introduction to the engineering properties and testing requirements of heavy civil construction materials. Focuses on aggregates, asphalt, Portland cement concrete, wood and steel as construction materials to meet various ASTM Standards. **Prerequisites:** NONE

CIVE 441 5 CR**Concrete Design**

This course provides a fundamental introduction to strength analysis and design of reinforced concrete members along with current code provisions. Topics include: combined bending and compression, development and anchorage of reinforcement, deflections, design of slabs including one-way and two-way, design of footings, retaining walls, introduction to pre-stressed concrete, and design issues with multi-story buildings.

Prerequisites: ENGR 401

CIVE 442 5 CR**Steel Design**

This course provides a fundamental introduction to strength analysis and design of steel members along with current code provisions. Topics include: familiarity with AISC Manual of Steel Construction, layout and design of building components using steel products, fundamental principles of structural steel design, and design issues for typical multi-story buildings. **Prereq:** CIVE 441

CIVE 443 5 CR**Structural Analysis**

This course provides an advanced structures course which includes the use of structural computer modeling software. Topics include: modeling of structures, supports, and loads to determine stability of trusses, beams, frames, and arches when subjected to axial forces, shear forces, and bending moments.

Prerequisites: CIVE 442

CIVE 451 5 CR**Geotechnical Engineering**

This course provides a fundamental introduction to the physical properties of soils including compaction, flow of water through soils, stress distribution, and consolidation. This course includes fieldwork, lab work, and report preparation. **Prerequisites:** ENGR 401

CIVE 452 5 CR**Foundation Engineering**

This course focuses on the geotechnical design of shallow and deep foundations. Topics include: subsurface exploration, deep foundations, short and long term monitoring, bearing capacity, settlement, and lateral loads for spread footings, driven piles, and drilled piers.

Prerequisites: CIVE 451

CIVE 453 5 CR**Earth Retaining Structures**

This course focuses on the geotechnical design of soil slopes and various soil retaining methods. Topics include: Soil compaction, drainage, slope stability, and soil pressures. **Prerequisites:** CIVE 452

CMST 210 4 CR**Workplace Communications**

Focuses on interpersonal communication in the workplace. Students explore perception, language, self-concept, self-disclosure, listening, and conflict resolution management, and experience the concepts through class activities.

Prerequisites: NONE

COMP 151 4 CR**Spreadsheets for Engineering Modeling**

This course provides a practical hands-on experience with spreadsheet modeling. Students will work through a series of engineering project activities while learning spreadsheet skills including: job time sheet preparations, data formatting, basic functions, functions, imbedded logic, and lookup tables. **Prerequisites:** NONE

COMP 301 5 CR**C for Engineers**

This course introduces structured computer programming and problem solving, specifically for engineering technology students, using the C language. Problem examples emphasize numerical solutions common to engineering. Emphasis is placed on programming principles, programming techniques and the process of solving engineering problems using computers.

Prerequisites: NONE

ECON 401 5 CR**Engineering Economics**

This class provides the fundamentals of traditional Time Value of Money methods to form an economic basis for improvement decisions. The course covers decision methods, economic consideration, and system optimization using economic variables.

Prerequisites: NONE

ENGL 205 4 CR**Technical Writing**

This class provides an introduction to technical writing and presentation methods. The course focuses on the preparation of various documents including: resumes, letters, papers, presentations, forms, and a company brochure. **Prerequisites:** COMP 151

ENGL 301 5 CR**Proposals and Grant Writing**

This course provides basic principles in persuasive technical writing for the engineering workplace. Students work on persuasive technical documents to improve their ability to write clear, detailed prose, while persuading the intended audience. Competence in mechanics and standard English usage is assumed of all students.

Prerequisites: NONE

ENGL 302 5 CR**Technical Report Writing**

This course provides an overview of civil engineering technical documents production. The course emphasizes such skills as clarity, objectivity, audience analysis and adherence to format. Students use subjects within their intended majors or career fields to write business correspondence, memoranda, resumes, mechanism descriptions, progress reports and analytical research reports.

Prerequisites: NONE

ENGR 299 1-4 CR**Internship Work Experience**

This course provides an employer evaluated internship work experience. The course provides 1CR for each (40) hours of verified internship work experience, up to a maximum of 4CR. The course requires a signed Employer Internship Agreement and a signed Supervisor Evaluation Form to be submitted to the assigned faculty advisor for grading.

Prerequisites: NONE

ENGR 401 5 CR**Engineering Mechanics – Statics 1**

This class provides a fundamental course in engineering mechanics for particles and rigid bodies in equilibrium with civil engineering applications. Applied problems include two and three dimensions using both scalar and vector algebra methods. **Prereq:** PHYS 301

ENGR 402 5 CR**Engineering Mechanics – Statics 2**

This class provides a fundamental course in engineering mechanics for particles and rigid bodies in equilibrium with civil engineering applications. Applied problems include two and three dimensions using both scalar and vector algebra methods. **Prereq:** ENGR 401

ENGR 403 5 CR**Engineering Mechanics – Dynamics 1**

This class provides a fundamental course in engineering mechanics for particles and rigid bodies experiencing acceleration. Students study unbalanced forces and torques acting on bodies, and the resulting motion using scalar and vector algebraic methods. **Prerequisites:** ENGR 402

ENGR 471 5 CR**FE/EIT Exam Preparatory**

This course prepares the EIT candidate to take the NCEES Civil FE Exam. In addition, the class provides a venue for candidates to meet and form study groups to further prepare for the exam. This class specializes in the Civil FE Exam specialization. However, the morning exam is the same for everyone, so candidates from other disciplines would gain from this class as well.

Prerequisites: BSCET Program Senior

ENGR 499 1-5 CR**Senior Engineering Project**

This course is conducted as a special project under the direction of a faculty member. This course includes a written project proposal, research, design, evaluation, preparation of a project report, and a presentation of the project findings to a group of peers and faculty members.

Prerequisites: NONE

ENVR 201 4CR**Agronomy 1 – Soils Science**

This course provides an introduction to soil science with a focus on local soils and agriculture management. Coursework includes topics in soil formation, management, classification, physical properties, chemical properties, hydrologic cycle, organisms, nutrients, amendments, fertilizers, and soil conservation.

Prerequisites: NONE

ENVR 202 4CR**Agronomy 2 – Crop Science**

This course provides an introduction to crop science with a focus on Washington State crops. Coursework includes topics in specific crops, anatomy, life cycle, growth factors, pests, production, management, and protection.

Prerequisites: ENVR 201

ENVR 221 4CR**Wetlands**

This course provides an introduction to wetland delineation and mapping. Coursework includes topics in wetland soils, water, plants, delineation, and mapping.

Prerequisites: CADD111

ENVR 401 5CR**Irrigation and Water Rights**

This course provides an introduction to irrigation design with a focus on Washington State agriculture. Coursework includes topics in soil-water-plant relationships, water requirements, system capacity, selection criteria, pressurized systems, pumps and system curves, fixed systems, self-move pivot and lateral systems, trickle systems, surface systems, and drainage considerations. In addition, this course provides an introduction to water rights and land law and how it is related to agricultural uses of the land.

Prerequisites: CADD111

GIS 121 4 CR**ArcGIS Level 1**

This course is a practical hands-on experience. Students will work through a mapping project using ArcView and ArcEditor to accomplish certain tasks and solve problems along the way. The class covers the software interface, map data, map attributes, data acquisition, symbolizing features and rasters, classifying features and rasters, labeling features, querying data, joining tables, feature selection by location, preparing data by analysis, analyzing spatial data, and projecting data in ArcMap.

Prerequisites: NONE

HCON 122 4 CR**Earthmoving Fundamentals**

This course provides an introduction to earthmoving production fundamentals of construction equipment. The production of heavy equipment, including excavators, scrapers, trucks, bulldozers, and front end loaders is examined from a production perspective. In addition, earthwork conversions between loose cubic yards, bank cubic yards, and compacted cubic yards is covered.

Prerequisites: NONE

HCON 201 4 CR**Construction Estimation**

This course combines the learning of the MS Excel software with a classic heavy civil construction estimation course. Students will learn conceptual project estimating as well as detailed unit cost estimation concepts. Students will practice timely quantity take offs for water, sewer, and stormwater piping and structures from civil plans. In addition, students will learn average end area methods for roadway material volumes and the grid method for site grading volumes. The course concludes with bid process fundamentals and a timely competitive bid.

Prerequisites: NONE

HCON 202 4 CR**Construction Scheduling**

This course provides an introduction to precedence diagrams, activity networks, project float calculations, and critical path management specific to the heavy civil construction industry. The course focuses scheduling fundamentals and concludes with the use of MS Project to prepare and adjust a project schedule.

Prerequisites: NONE

HCON 221 4 CR**Construction Business & Financing**

This course provides an introduction to business and financing specific to the heavy civil construction industry. Topics include basic accounting, payroll, financial statements, elements of a business plan, permanent loans, construction loans, sources of mortgage, venture capital, tax and interest considerations.

Prerequisites: NONE

HCON 421 5 CR**Contracts and Construction Law**

This course provides a fundamental introduction to construction law specific to the heavy civil construction industry. The course focuses on contracts and subcontracts, business law basics, and construction law fundamentals.

Prerequisites: NONE

HCON 422 5 CR**Construction Project Controls**

The course provides a fundamental introduction to the methods for controlling heavy civil construction projects. The course focuses on job estimate review, cost account codes, budget monitoring, performance forecasting, and project schedule review.

Prerequisites: HCON 421

HCON 423 5 CR**Construction Resource Accounting**

This course provides a fundamental introduction to resource accounting for the heavy civil construction industry. The course focuses on the reading of real world example project budgets and the preparation of project budgets based on project estimates and heavy civil construction plans. In addition, the fundamentals of time value of money are covered to support the budget process.

Prerequisites: HCON 422

INDE 201 4 CR**Manufacturing Methods and Standards**

This course provides an introduction to the Lean Manufacturing standards. Students will learn about Sorting, Straightening, Shine, Standardizing, and Sustaining manufacturing methodology for modeling efficient manufacturing processes.

Prerequisites: MECH 101

INDE 401 5 CR**Probability and Statistics for Engineering**

This class covers quantitative analysis of uncertainty and risk for engineering applications. Fundamentals of probability, random processes, statistics, and decision analysis are covered, along with random variables and vectors, uncertainty propagation, risk-based decision, estimation of distribution parameters, hypothesis testing, simple and multiple linear regressions.

Prerequisites: MATH 301

INDE 451 5 CR**Plant Layout and Materials Handling**

Modeling and analysis of structural and operational issues associated with material-flow system design including facility location, warehouse/inventory systems, and distribution/transportation systems.

Prerequisites: AASMET Degree

INDE 452 5 CR**Engineering Quality Control**

This course provides an introduction to quality in manufacturing including control charts, sampling plans, process capability, experimental design; introduction to system reliability. The course includes an overview of Six Sigma and DMAIC methodology.

Prerequisites: INDE 401

INDE 453 5 CR**Production Management Systems**

Design and operation of production systems, including lean production concepts, just-in-time/kanban, facility layout and material flow issues.

Prerequisites: INDE 451

MANF 201 4 CR**Geometric Dimensioning & Tolerancing**

Students will learn Geometric Dimensioning and Tolerancing (GD&T) standards using software by conducting various projects.

Prerequisites: MECH111

MANF 202 4 CR**Advanced Metrology**

This course builds on the Metrology 1 course with industrial measurements. Coursework includes touch arms, 3D hand scanning, comparative modeling and analysis, data processing, and reporting.

Prerequisites: MECH 201

MANF 203 4 CR**Industrial Scanning**

This course provides an introduction to industrial scanning field data acquisition and office data processing as it relates to process piping. Coursework includes field setup, field control, office data processing, and 3D asbuilt model preparation.

Prerequisites: MANF 202

MANF 401 5 CR**Reverse Engineering**

This course provides an introduction to reverse engineering using a combination of 3D scanning, hand measurements, and touch arm measurements. The course includes a final project for the preparation of a high precision 3D Model from a physical part with analytical comparison to a design model.

Prerequisites: MANF 202

MATH 131 4 CR**Engineering Math – Algebra 1**

This course provides an applied precalculus algebra course. Topics to be covered include coordinate systems, graphing, slopes, transformations, composite functions, inverse functions, distance and midpoint, and modeling with functions. Students will gain an understanding of these mathematical tools in the context of practical problem solving, particularly for engineering applications.

Prerequisites: Demonstrated Intermediate Algebra Skills

MATH 132 4 CR**Engineering Math – Algebra 2**

This course provides an applied precalculus algebra course. Topics to be covered include complex numbers, quadratic functions, polynomial functions, dividing polynomials, zeros of polynomials, rational functions, polynomial inequalities, and exponential functions. Students will gain an understanding of these mathematical tools in the context of practical problem solving, particularly for engineering applications.

Prerequisites: MATH131

MATH 133 4 CR**Engineering Math – Trigonometry 1**

This course provides an applied precalculus algebra course. Topics to be covered include radians, unit circles, right triangles, trigonometric functions, trigonometric graphing, and trigonometric identities. Students will gain an understanding of these mathematical tools in the context of practical problem solving, particularly for engineering applications.

Prerequisites: MATH132

MATH 231 4 CR**Engineering Math – Trigonometry 2**

This course provides an applied precalculus algebra course. Topics to be covered include law of sines, law of cosines, polar coordinates, vectors, and dot product. Students will gain an understanding of these mathematical tools in the context of practical problem solving, particularly for engineering applications.

Prerequisites: MATH133

MATH 232 4 CR**Engineering Math – MathCAD**

This course provides a practical hands-on experience with the MathCAD software by modeling engineering problems with mathematics. Students will work through a series of engineering physics and structural engineering calculations while learning MathCAD skills.

Prerequisites: MATH231

MATH 233 4 CR**Engineering Math – Calculus Preparatory**

A preparation course for Calculus. This course is designed to review and prepare the student for the junior level calculus coursework. Students will gain an understanding of these mathematical tools in the context of practical problem solving, particularly for engineering applications.

Prerequisites: MATH232

MATH 301 5 CR**Engineering Math – Calculus 1**

This is the first quarter of a course of study in calculus and analytic geometry. This course includes an introduction to limits, rates of change and continuity. The course also deals with the definition of derivative of a function and rules of differentiation, curve sketching and other application of differentiation, introduction to integrals and the Fundamental Theorem of Calculus. **Prerequisites:** MATH 233 or Instructor Permission

MATH 302 5 CR**Engineering Math - Calculus 2**

This is the second quarter of a three-quarter course of study in calculus, analytic geometry, probability and statistics. This course begins with Newton's Method and the Fundamental Theorem of Calculus. The focus of the course is on techniques of integration and applications, including inverse trigonometric, exponential, logarithmic, hyperbolic functions, partial fractions, and improper integrals. **Prerequisites:** MATH 301

MATH 303 5 CR
Engineering Math - Calculus 3
This is the third quarter of a course of study in calculus and analytic geometry. Continued techniques of integration, differential equations, topics in probability and statistics, infinite sequences and series, Taylor and Maclaurin series, Fourier series, Fourier and Laplace transforms. **Prerequisites: MATH 302**

MATH 401 5 CR
Engineering Math - Linear Algebra
This course provides an introduction to linear equations, vector products, matrix operations, matrix transformations, determinants, and systems of linear equations. **Prerequisites: MATH 303**

MATH 402 5 CR
Engineering Math – Multi-Variable Calculus
A course designed to give students an introduction to the basic concepts of multivariable calculus using the tools of linear algebra as applicable; vector functions, real valued functions, differentiation of scalar functions, multiple integration, vector differentiation and integration, transformation of coordinates, Green's Theorem, Stoke's Theorem, Gauss' Theorem and Lagrange Multipliers. **Prerequisites: MATH 303**

MECH 101 4 CR
Mechanical Engineering Careers
This course provides an introduction to the mechanical engineering technology profession. Students will learn about the various software and equipment job skills required for careers in aerospace manufacturing, renewable energy manufacturing, and process piping design. Various jobs specialties include; engineering technician, manufacturing technician, CADD Drafter, CADD Designer, 3D Printing Technician, and CNC Machine Technician. **Prerequisites: NONE**

MECH 111 4 CR
Solidworks Mechanical Design Level 1
This course is a practical hands-on experience. Students will work through a mechanical design project using Solidworks software to accomplish tasks and solve problems along the way. The course covers the basics of the software interface, sketching solid models, adding sketch constraints, adding sketch dimensions, editing sketches, extruding, revolving sketches, modeling options, modeling tools, editing features, and automatic dimensioning. **Prerequisites: NONE**

MECH 112 4 CR
Solidworks Mechanical Design Level 2
This course is a practical hands-on experience. Students will work through a mechanical design project using Solidworks software to accomplish tasks and solve problems along the way. The course covers advanced elements of modeling tools, assembly modeling, drawing views, presentation, design tools, sheet metal components, and weldments. **Prerequisites: MECH 111**

MECH 113 4 CR
Solidworks Mechanical Design Level 3
Students will work as a team to design a final project using Solidworks software accomplish tasks and solve problems along the way. The STL output from this project will be used in the following MECH 221 CNC and 3D Printer Fundamentals course. **Prerequisites: MECH 112**

MECH 121 4 CR
Fabrication and Welding Lab 1
This course provides an introduction to traditional metal shop fabrication and safety. Topics include hand tools, fabrication materials, bending, drilling, gas/plasma cutting, stick welding, tig welding, and fabrication finishing techniques. **Prerequisites: NONE**

MECH 122 4 CR
Fabrication and Welding Lab 2
This course continues the development of traditional metal shop fabrication skills. Topics include hand tools, fabrication materials, bending, drilling, gas/plasma cutting, stick welding, tig welding, and fabrication finishing techniques. **Prerequisites: MECH 121**

MECH 131 4 CR
Rhino 3D Modeling
This course is a practical hands-on experience. Students will work through a basic mechanical design project using Rhinoceros software, showing many different methods to accomplish certain tasks and solve problems along the way. Students will learn Rhinoceros 3D modeling software by conducting mechanical industry applications. Thus students are learning fundamentals of the profession at the same time as learning the Rhinoceros software. Course material includes software interface, free-form surfaces, curves, point objects, curve manipulation, solids, polysurfaces, polygon meshes, object transformation, rendering, and data exchange. **Prerequisites: NONE**

MECH 201 4 CR
Metrology 1
This course provides an introduction to industrial measurements. Coursework includes an overview of precision hand measurement tools and a review of geometric dimensioning and tolerancing use in industry. **Prerequisites: MECH113**

MECH 202 4 CR
3D Laser Scanning
This course provides an introduction to working with asbuilt laser scanning data to conduct process piping design. The course also provides a basic background on process piping drafting. **Prerequisites: CADD 112**

MECH 203 4 CR
CNC Programming
Students will learn how to program GCODE by text editing. Then students will use a program that will prepare GCODE and conduct detailed editing of the GCODE by text editing. Students will then use a mini-CNC machine to run their GCODE as the final project. **Prerequisites: NONE**

MECH 221 4 CR
Applied Mechanics for Engineering Technology
This class provides a fundamental introduction to engineering mechanics for rigid structures in equilibrium with mechanical applications. This statics course is limited to trigonometric and algebra level calculations (no calculus). The intent is to provide associate's level students with the ability to determine forces and stresses in elementary mechanical systems. **Prerequisites: MATH 133**

MECH 222 4 CR**Materials Science 1**

This course provides an introduction to the engineering properties and testing requirements of materials. Focuses on metals, woods, plastics, and composite materials to meet various ASTM Standards.

Prerequisites: MECH 221

MECH 231 4 CR**Design Project**

Students will work as a team to prepare a full set of plans and specifications for their design project as a capstone portfolio project for the program. The course includes a presentation of the design project to an industry panel.

Prerequisites: MECH 213

PATA 421 5 CR**Patent Process**

This course provides an overview of patent law, focusing on the federal patent laws (35 U.S.C. 1 et seq.). This course introduces students to the U.S. patent system, issues relating to patent law, patentability, benefits of obtaining patent protection, defenses to and remedies for patent infringement, and patent issues abroad.

Prerequisites: ENGL 301

PATA 422 5 CR**Patent Drafting**

This is a practical skills course that teaches the fundamentals of preparing a patent application, with particular emphasis on claim drafting. Drafting techniques useful for all technical subject matters will be covered. Students will draft a claim and prepare patent application documents suitable for filing in the U.S. Patent and Trademark Office as a course project.

Prerequisites: PATA 421

PHYS 121 4 CR**Introduction to Physics**

This course provides a broad survey of mechanics, heat, and sound for engineering technology students. This physics course is limited to trigonometric and algebra level calculation (no calculus). The intent is to provide associate's level students with a fundamental understanding of physics in order to conduct the Statics for Building Construction course. The course includes a weekly physics lab and report preparation.

Prerequisites: MATH 133

PHYS 301 5 CR**Applied Engineering Physics 1**

This is the first quarter of a three-quarter course of study in engineering physics. This course includes engineering physics applications with an emphasis on mechanics. Topics include physical measurements, 1D kinematics, vectors, 2D kinematics, Newton's laws, circular motion, and energy of a system.

Prerequisites: MATH 233 or Demonstrated Pre-Calculus Skills

PHYS 302 5 CR**Applied Engineering Physics 2**

This is the second quarter of a three-quarter course of study in engineering physics. This course includes engineering physics applications with an emphasis on mechanics. Topics include conservation of energy, linear momentum & collisions, rotational kinematics, angular momentum, static equilibrium, universal gravitation, and fluid mechanics.

Prerequisites: PHYS 301

PHYS 303 5 CR**Applied Engineering Physics 3**

This is the third quarter of a three-quarter course of study in engineering physics. This course includes engineering physics applications with an emphasis on thermodynamics and wave mechanics. Topics include laws of thermodynamics, thermal properties of matter, mechanical waves, sound and light.

Prerequisites: PHYS 302

PLAN 121 4 CR**Zoning, Permitting, and Government Agencies**

The course introduces students to the local planning, zoning, permitting process, and government agency process. Students will develop a basic understanding of the local government project review process from application through approval. Students will prepare development applications for a project and present the project as if to a Hearing Examiner or Planning Commission. The class covers the basics of zoning, SEPA, SMA, GMA, public hearings, and the development review process. **Prerequisites:** NONE

PROE 201 4 CR**Food Processing Design 1 – Conversion**

This course provides basic familiarity with food processing of food raw materials. Topics include cleaning, contaminations, sorting, grading, size reduction, screening, disintegration, mixing, emulsification, and filtration.

Prerequisites: MECH211

PROE 202 4 CR**Food Processing Design 2 – Preservation**

This course provides basic familiarity with food preservation operations for converted food raw materials. Topics include heat processing, microbiological consideration, sterilization, pasteurization, evaporation, dehydration, freezing, and food storage conditions, and packaging.

Prerequisites: PROE 201

PROE 203 4 CR**Food Processing Project**

This course provides a capstone project for the Food Processing Design series of courses. Student teams will coordinate with industry to analyze and existing food process, identify cost effective improvements, design improvements, prepare a food processing report, and present that report.

Prerequisites: PROE 202

PROE 401 5 CR**Process Simulation**

This course introduces students to process simulation methods and software. Student teams will coordinate with industry to analyze and model an existing food process. Student teams will then prepare, run, record their process model in action, and post the process simulation to Youtube as a portfolio project.

Prerequisites: MECH 231

RENG 201 4 CR**Solar Power Fundamentals**

This course provides the fundamentals of Solar Power production. The course materials include an overview of solar radiation physics and heat transfer. In addition, the course covers traditional system components including mirror collectors, plate collectors, water heating, and cooling. **Prerequisites: NONE**

RENG 211 4 CR**Wind Power Fundamentals**

This course provides the fundamentals of Wind Power production. The course materials include an overview of wind physics. In addition, the course covers traditional system components including vertical and horizontal axis turbines, generators, and governors.

Prerequisites: NONE

RENG 221 4 CR**Hydro Power Fundamentals**

This course provides the fundamentals of Hydro Power production. The course materials include an overview of hydrology physics, power, head, and flow-rate. In addition, the course covers traditional system components including spillways, gates, valves, trashracks, penstocks, generators, hydro batteries, and governors. **Prerequisites: NONE**

RENG 401 5 CR**Power Design 1 - Site Analysis**

This course provides a hands-on experience with the development of a demonstration water, wind, or solar power project. Students will prepare a written system plan to include all mechanical drawing, mechanical specifications, power generation analysis, return on investment analysis, installation scope, installation budget, and installation schedule. Includes a presentation of the system plan.

Prerequisites: RENG 203

RENG 402 5 CR**Power Design 2 - Testing**

This course provides a hands-on experience with the development of a demonstration water, wind, or solar power project. Students will conduct a site assessment, site surveying, and resource testing. In addition, students will design, fabricate, test, and experiment with system components for power generation.

Prerequisites: RENG 401

RENG 403 5 CR**Power Design Project**

This course provides a hands-on experience with the development of a demonstration water, wind, or solar power project. Students will acquire system components for field assembly. Students will then pre-fabricate the system as much as possible before transport and final assembly on site. After the system is assembled on-site, it will need trouble shooting, monitoring, and testing so that it can be adjusted to produce as much power as possible. This demonstration project will be temporary and off-grid in nature. All materials are to be recovered for use by the next class year.

Prerequisites: RENG 402

ROBO 201 4 CR**Robotics Engineering Fundamentals**

This course provides basic familiarity with electronic circuits and operational amplifiers through the design and analysis of feedback control systems and actuators in mechatronic systems.

Prerequisites: MECH211

ROBO 202 4 CR**Python Programming for Robotics**

This continues the develop familiarity with electronic circuits and operational amplifiers through the design and analysis of automatic control systems in mechatronic systems.

Prerequisites: ROBO 201

ROBO 203 4 CR**Programmable Logic Controllers**

This course builds on the first two courses in the design of mechatronic systems. This course focuses on the software interface and programming tools for mechatronic systems.

Prerequisites: ROBO 202

ROBO 401 5 CR**Robotic Engineering 1**

This course provides an introduction to designing mechatronic system, which require integration of the mechanical and electrical engineering disciplines. Course topics include interfacing of software with hardware, graphic programming tools, digital logic, analog interfacing, power amplifiers, measurement and sensing, electromagnetic, optical transducers, control of mechatronic systems.

Prerequisites: MECH211

ROBO 402 5 CR**Robotic Engineering 2**

This course builds on the first course in the sequence with the design of mechatronic systems, requiring integration of the mechanical and electrical engineering disciplines. Course topics include interfacing of software with hardware, graphic programming tools, digital logic, analog interfacing, power amplifiers, measurement and sensing, electromagnetic, optical transducers, control of mechatronic systems.

Prerequisites: ROBO 401

ROBO 403 5 CR**Robotics Engineering 3**

This course builds on the previous two courses in the sequence with the design of mechatronic systems, requiring integration of the mechanical and electrical engineering disciplines. This course is focused on the planning, acquisition, assembly, troubleshooting, and operation of a mechatronics project to automatically perform a specified human work activity.

Prerequisites: ROBO 402

SURV 132 4 CR**Topographic Land Surveying**

This course provides a hands-on field experience by mapping site features and topography with total station land surveying equipment. Students practice timely setup, control orientation, topographic mapping techniques, and site feature surveying. **Prerequisites: NONE**

SURV 134 4 CR**Construction Land Surveying**

This class provides a hands-on field experience with construction surveying. Students practice construction surveying in teams with traditional total station surveying equipment including; roadway staking, utility staking, grade staking, grid surveys, and stockpile volume surveys.

Prerequisites: NONE

SURV 231 4 CR**Control Network Land Surveying**

This course provides a hands-on field experience with total station and autolevel surveying equipment based on traditional ground control. Students practice timely total station setup, control orientation, advancing traverse control, sideshots, timely autolevel setup, and level loops.

Prerequisites: SURV 132

SURV 221 4 CR**Boundary Law**

Covers historical to present United States land title conveyancing, historical surveying procedures, colonial and precolonial land grants, the United States public land survey system, rules of construction and procedures for boundary retracement, recording systems, interpretation of property descriptions, and Professional responsibility.

Prerequisites: SURV201

SURV 222 4 CR**Advanced Legal Descriptions**

Study of the writing and interpretation of legal descriptions as they pertain to the conveying of land. Types of legal descriptions. Written intentions of the parties. Controlling elements in descriptions. Easement descriptions. Rights associated with written descriptions versus unwritten rights. Other special topics in legal descriptions.

Prerequisites: SURV 221

SURV 223 4 CR**Public Lands**

Covers historical to present United States public land survey system using significant cases from the BLM casebook and the BLM manual of surveying instructions.

Prerequisites: SURV 222

SURV 401 5 CR**GPS Machine Control**

This course covers the fundamentals of GPS machine control in both agricultural and heavy civil construction applications. Course topics include GPS fundamentals, site modeling, controls installation, controls calibration, machine control operations, real time work updates, and work planning.

Prerequisites: SURV 231

SURV 402 5 CR**Drone/UAV Site Surveying**

This course covers the fundamentals of UAV hardware and software operations for site surveying in both agricultural, civil engineering, and land surveying applications. Course topics include equipment purchasing, UAV laws, sporting pilots license requirements, flight planning, ground control, field operations, site modeling, imagery analysis, video presentation, survey mapping uses and laws. **Prerequisites:** SURV 231

SURV 421 5 CR**Survey Computations**

This course covers statistics as applied to surveying, error estimation, error propagation, basic matrix algebra, level network analysis, 3D travers analysis, GPS vector network analysis, combines traditional total station and GPS network analysis, blunder detection, positional tolerance, and hypothesis testing.

Prerequisites: SURV 231

Washington Engineering Institute

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The Wolverine Back Story:

Why the Washington Engineering Institute has a Wolverine as its mascot



The Wolverine was extinct in Washington State and is now making a tremendous comeback. They have traveled south from Canada and have begun to recolonize their native habitat in Washington State's high snowy woodlands.

The Wolverine is a carnivore and largest member of the Weasel family with some specimens getting up to 45 pounds. Pound-per-pound one of the most ferocious, independent, hardy, nimble, clever, and determined animals in Washington State.

Shawn Sartorius, a wildlife biologist based in Helena, Montana, for the U.S. Fish and Wildlife Service provided an excellent quote on how the Wolverine challenges itself as follows:

Wolverines "are the superheroes of the animal world ... when you follow the tracks of these things, you see they are not taking the easy way around; they will go straight over mountaintops, craggy peaks, the rockiest, steepest, cliffiest place; they will go right over that in the middle of winter, at night."

The Wolverine's impressive characteristics compliment the Washington Engineering Institute motto: **"Challenge Yourself."** In short, the Wolverine challenges itself every-moment of every-day.