

## **Fall 2005, Revised Summer 2008, Effective Fall 2009<sup>1</sup>** **Statewide Engineering AS-T Track 2 Major Related Program (MRP) Agreement**

These pathways are applicable to students planning to prepare for various engineering majors at universities in Washington.

This document represents agreement regarding expanded detail for the existing Associate in Science - Transfer, Track 2 between the baccalaureate institutions offering engineering bachelor's degrees and the community and technical college system. Baccalaureate institutions parties to this agreement are: University of Washington Seattle, Washington State University, Eastern Washington University, Gonzaga University, Saint Martin's University, Seattle Pacific University, Seattle University, and Walla Walla University.

### **Community colleges agree:**

- When community colleges list the AS-T, track 2 in their publications, they will provide the expanded detail shown below regarding the three major pathways in the field of engineering while retaining the current AS-T, track 2 description for purposes of students majoring in computer science, physics and atmospheric sciences.
- When community colleges award the AS-T degree for engineering students following these expanded details, rather than using AS-T #2 on the transcript, colleges will designate completion as follows for clarity on the transcript and use by SBCTC for tracking reporting purposes:
  - AS-T Bio/Chem E/MRP. Exit Code of B (eventually will be O), EPC BIOE and CIP of 14.0701
  - AS-T Comp E EE/MRP Exit Code of B (eventually will be P), EPC of CEE and CIP of 14.1001
  - AS-T Other Engineer/MRP Exit Code B (eventually will be Q), EPC of OTRE and CIP of 14.1901
- If community colleges find that changes to the MRP are needed, they will notify the Instruction Commission, which will, in turn, notify the Joint Access Oversight Group (JAOG). JAOG will review the changes, as detailed in the section below (review process posted on the HECB web site <http://www.hecb.wa.gov/research/issues/transfer.asp>).
- Where the pathway lists student choice in engineering classes, the published associate degree listing will include advice to students about contacting potential transfer institutions regarding their choices.

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<sup>1</sup> 2008/09 Modifications applicable to all options:

- Removed General Chemistry from Physics requirement and added to new **Chemistry** requirement.
- Moved Computer Programming requirement to **Other Pre-major Prerequisites & Electives** category. Increased credit requirement in this category by 4/5 credits. Removed 'Computer Programming' category (to align with AS-T Track 2 modifications approved by HECB September 18, 2008).
- The **Humanities/Fine Arts/English and Social Science** requirements were clarified by duplicating AS-T Track 2 requirements and adding "A course in Economics is recommended" to each option.

### **The participating baccalaureate institutions agree:**

- Students completing the AS-T Track 2 degrees, including those who follow these expanded details will, if admitted to the university, be admitted as juniors with all or most prerequisites for the specific engineering major completed (depending on choices made among engineering electives). In addition, these students will have lower division general education courses partially completed in a manner similar to the partial completion by freshmen-entry engineering students.
- The same 2.0 GPA requirement that applies to AS-T in general applies to these expanded details pathways. Engineering programs are competitive and may require a higher GPA overall or a higher GPA in specific courses.
- Baccalaureate institutions will apply up to 110 quarter credits required under this agreement to the credits required in the bachelor's degree, subject to institutional policy on the transfer of lower division credits.
- Baccalaureate institutions will each build an **alert mechanism** into their curriculum review process for changes related to the prerequisites for the engineering degree.
  - The alert will go to the institution or sector JAOG member.
  - If the proposed change will affect lower division course taking, the JAOG member will bring the issue to JAOG attention for action to review or update this Major Related Program Agreement.
- Prior to making changes in the admission requirements, institutions agree to participate in the JAOG-designed **review process** and to abide by the related implementation timelines (review process posted on the HECB web site - <http://www.hecb.wa.gov/research/issues/transfer.asp>).
- This statewide process applies only to changes<sup>2</sup> in the requirements for admission to the major. References to changes do not include changes in graduation requirements that are completed at the upper division level or the GPA an institution may establish for admission to a program.

### **The Joint Access Oversight Group (JAOG) will:**

- Notify the HECB when undertaking a review of possible changes in the pathway and of subsequent changes made to the agreement.

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<sup>2</sup> As judged by impact on students. This statewide process comes into play when potential majors need to complete specific courses not previously identified or present test results or information not included in the agreement.

## Associate in Science – Transfer, Track 2 Expanded Detail for Engineering MRPs

Engineering is a broad discipline and one pathway will not fit the requirements for all sub-disciplines contained within engineering. Therefore, these pathways within the Associate of Science – Transfer, Track 2 Degree are designed for the following major areas:			
Associate of Science – Transfer, Track 2 Degree Requirements	Bioengineering and Chemical pre-Engineering (BIO and CHEM E) Pathway	Computer and Electrical pre-Engineering (Comp E and EE) Pathway	Mechanical/Civil/Aeronautical/ Industrial/ Materials Science/ pre- Engineering (Other Engineering) Pathway
<b>Communication Skills (Min. 5 quarter credits)</b> College level composition course.	<b>Communication Skills</b> College Writing - <i>5 credits</i>	<b>Communication Skills</b> College Writing - <i>5 credits</i>	<b>Communication Skills</b> College Writing - <i>5 credits</i>
<b>Mathematics (10 quarter credits)</b> Two courses at or above introductory calculus level. Third quarter calculus or approved statistics course: 5 quarter credits chosen with the help of an advisor based on the requirements of the specific discipline at the baccalaureate institution the student plans to attend.	<b>Mathematics</b> Calculus 1,2,3 - <i>15 credits</i> Differential Equations - <i>3-5 credits</i>	<b>Mathematics</b> Calculus 1,2,3 - <i>15 credits</i> Differential Equations - <i>3-5 credits</i> Linear Algebra - <i>5 credits</i>	<b>Mathematics</b> Calculus 1,2,3 - <i>15 credits</i> Differential Equations - <i>3-5 credits</i> Linear Algebra - <i>5 credits</i>
<b>Physics (15 quarter credits)</b> Calculus-based or non-calculus based sequence including laboratory. Students should be advised that some baccalaureate programs require physics with calculus.	Engineering Physics 1,2,3 + labs - <i>15-18 credits</i>	Engineering Physics 1,2,3 + labs <i>15-18 credits</i>	Engineering Physics 1,2,3 + labs <i>15-18 credits</i>
<b>Chemistry with laboratory (5 quarter credits)</b> required for Engineering majors. Others should select 5 credits of science based on advising.	General Chemistry 1,2,3 + labs <i>15-18 credits</i> Organic Chemistry 1 + lab - <i>4-6 credits</i> Organic Chemistry 2 or Biology for Science Majors + labs - <i>4-6 credits</i>	General Chemistry 1 + lab <i>5-6 credits</i>	General Chemistry 1,2 + labs <i>10-12 credits</i>

Associate of Science – Transfer, Track 2 Degree Requirements	Bioengineering and Chemical pre-Engineering (BIO and CHEM E) Pathway	Computer and Electrical pre-Engineering (Comp E and EE) Pathway	Mechanical/Civil/Aeronautical/Industrial/ Materials Science/ pre-Engineering (Other Engineering) Pathway
<p><b>Other Pre-major Prerequisites &amp; Electives</b></p> <p>The remaining 31-quarter credits should be planned with the help of an advisor based on the requirements of the specific discipline at the baccalaureate institution the student selects to attend.</p> <p>For Engineering disciplines, these credits should include a design component consistent with ABET accreditation standards.</p>	<p><b>Engineering (14-15 credits)</b>  <u>Select 3 electives as appropriate for intended major and intended bachelor's institution:</u></p> <ul style="list-style-type: none"> <li>• Computer Programming - <b>4-5 credits</b></li> <li>• Linear Algebra</li> <li>• Calculus 4 (Advanced or Multi-variable Calculus)</li> <li>• Technical Writing</li> <li>• Electrical Circuits</li> <li>• Statics</li> <li>• Thermodynamics</li> <li>• Chemical Process, Principles and Calculations</li> <li>• Biology for Science Majors I + labs</li> <li>• Biology for Science Majors II + labs</li> <li>• Organic Chemistry 2 + labs</li> </ul>	<p><b>Engineering Required (8-10 credits)</b></p> <ul style="list-style-type: none"> <li>• Electrical Circuits - <b>4-5 credits</b></li> <li>• Computer Programming - <b>4-5 credits</b></li> </ul> <p><b>Math, Science &amp; Engr. Electives (20-25 credits)</b> <u>Select 5 electives as appropriate for intended major and intended bachelor's institution:</u></p> <ul style="list-style-type: none"> <li>• A second course in Computer Programming – object oriented - <b>4-5 credits</b></li> <li>• Innovation in Design</li> <li>• Calculus 4 (Advanced or Multi-variable Calculus)</li> <li>• Technical Writing</li> <li>• Statics</li> <li>• Dynamics</li> <li>• Thermodynamics</li> <li>• Digital Logic</li> <li>• Biology for Science Majors I + labs</li> <li>• General Chemistry 2 + lab</li> <li>• Applied Numerical Methods</li> <li>• Microprocessors</li> </ul>	<p><b>Engineering Required (15 credits)</b></p> <ul style="list-style-type: none"> <li>• Statics - <b>5 credits</b></li> <li>• Mechanics of Materials - <b>5 credits</b></li> <li>• Dynamics - <b>5 credits</b></li> </ul> <p><b>Math/Engr Electives – (15 credits)</b></p> <p><u>Select 4 Electives(15-20 credits) as appropriate for intended major and intended bachelor's institution:</u></p> <ul style="list-style-type: none"> <li>• Computer Programming - <b>4-5 credits</b></li> <li>• Innovation in Design</li> <li>• Calculus 4 (Advanced or Multi-variable Calculus)</li> <li>• 3-D Visualization and CAD (Engineering Graphics)</li> <li>• Technical Writing</li> <li>• Thermodynamics</li> <li>• Electrical Circuits</li> <li>• Materials Science</li> <li>• Applied Numerical Methods</li> </ul>

<p><b>Humanities / Fine Arts / English and Social Science (15 credits)</b> Minimum 15 quarter credits: Minimum 5 credits in Humanities, minimum 5 credits in Social Science, plus an additional 5 credits in either Humanities or Social Science for a total of 15 credits. Courses taken must come from the current ICRC distribution list in order to count as General Education or General University Requirements (GER's/GUR's) at the receiving institution. Additional general educational requirements, cultural diversity requirements, and foreign language requirements, as required by the receiving institution, must be met prior to the completion of a baccalaureate degree.</p>	<p><b><u>Humanities / Fine Arts / English and Social Science (15 credits)</u></b> Minimum 15 quarter credits: Minimum 5 credits in Humanities, minimum 5 credits in Social Science, plus an additional 5 credits in either Humanities or Social Science for a total of 15 credits. Courses taken must come from the current ICRC distribution list in order to count as General Education or General University Requirements (GER's/GUR's) at the receiving institution. Additional general educational requirements, cultural diversity requirements, and foreign language requirements, as required by the receiving institution, must be met prior to the completion of a baccalaureate degree.</p> <p>A course in <b>Economics</b> is recommended.</p>	<p><b><u>Humanities / Fine Arts / English and Social Science (15 credits)</u></b> Minimum 15 quarter credits: Minimum 5 credits in Humanities, minimum 5 credits in Social Science, plus an additional 5 credits in either Humanities or Social Science for a total of 15 credits. Courses taken must come from the current ICRC distribution list in order to count as General Education or General University Requirements (GER's/GUR's) at the receiving institution. Additional general educational requirements, cultural diversity requirements, and foreign language requirements, as required by the receiving institution, must be met prior to the completion of a baccalaureate degree.</p> <p>A course in <b>Economics</b> is recommended.</p>	<p><b><u>Humanities / Fine Arts / English and Social Science (15 credits)</u></b> Minimum 15 quarter credits: Minimum 5 credits in Humanities, minimum 5 credits in Social Science, plus an additional 5 credits in either Humanities or Social Science for a total of 15 credits. Courses taken must come from the current ICRC distribution list in order to count as General Education or General University Requirements (GER's/GUR's) at the receiving institution. Additional general educational requirements, cultural diversity requirements, and foreign language requirements, as required by the receiving institution, must be met prior to the completion of a baccalaureate degree.</p> <p>A course in <b>Economics</b> is recommended.</p>
<p><b>Total Maximum Credits 90 - 103</b></p>	<p><b>Total Maximum Credits 95 - 104</b></p>	<p><b>Total Maximum Credits 95 - 104</b></p>	<p><b>Total Maximum Credits 102 – 110</b></p>

## APPENDIX A

### Statewide Engineering AS-T Track 2 Major Related Program (MRP) Agreement

#### Participants to the Agreement

The Joint Access Oversight Group (JAOG) reviewed and approved minor modifications to the 2005 agreement on May 19, 2008, pending final approval by the HECB of proposed changes to remove computer science from the requirements in all AS-T Track 2 degrees. The HECB approved these changes September 18, 2008.

This document was originally forwarded for approval to the chief academic officers and Engineering Deans at UW Seattle, WSU, EWU, Gonzaga U, Saint Martin's U, Seattle Pacific U, Seattle U, Walla Walla U.

The Instruction Commission, on behalf of the Washington State Community and Technical Colleges, approved this agreement. A listing of the Community and Technical Colleges offering various engineering MRP agreements are available at the State Board for Community and Technical College at [http://www.sbctc.ctc.edu/college/e\\_transfer.aspx](http://www.sbctc.ctc.edu/college/e_transfer.aspx). Original copies of MRP, DTA, and AS-T agreements with signatures are available at the Higher Education Coordinating Board <http://www.hecb.wa.gov/research/issues/transfer.asp>.

Approved by the Baccalaureate Institutions: (Signatures of Engineering Deans and Provosts/Chief Academic Officers on file at the Higher Education Coordinating Board).

## APPENDIX B

### Engineering AS-T/MRP Workgroup Participants

Co-Chairs: Robert (Bob) Olsen and Jeff McCauley

### Community and Technical Colleges:

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Chris Byrne  
Muhammad Mir  
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Jeff McCauley  
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### Baccalaureate Institutions:

Anthony de Sam Lazaro  
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Carlos Oncina,  
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### Staff Support:

Loretta Seppanen, State Board for Community and Technical Colleges  
Andi Smith, Higher Education Coordinating Board  
Violet Boyer, Independent Colleges of Washington  
Cynthia Morana, Council of Presidents

### Joint Access Oversight Group Members (Original 2005 MRP )

Randy Lawrence, Vice President of Instruction, Olympic College, Co-Chair  
Jane Sherman, Vice Provost for Academic Policy and Evaluation, WSU, Co-Chair

Bill Eaton, Senior Vice President of Educational Services, Peninsula College  
Ivan Gorne, Vice President, Student Services, Bates Technical College  
Patricia Onion, Vice President for Educational Services, Whatcom Community College,  
Pam Praeger, Vice President for Learning/Chief Academic Officer, Spokane Falls Community College  
Laurie Kaye Clary, Vice President of Instruction, Grays Harbor College  
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Sandra Fowler Hill, Vice President of Instruction, Everett Community College  
Tracy Pellett, Associate Vice President for Undergraduate Studies, CWU  
Kris Bulcroft, Vice Provost for Undergraduate Education, WWU

John Sahr, Associate Dean, Undergraduate Academic Affairs, UW  
Larry Briggs, Associate Vice President for Enrollment Services, EWU  
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Randy Spaulding, Director, Academic Affairs, HECB  
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**Joint Access Oversight Group Members (for 2008 modifications)**

Jane Sherman, Vice Provost for Academic Policy and Evaluation, Washington State University, Co-chair  
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