Articulation Agreement

Montgomery College
Associate of Science in General Engineering
900 Hungerford Drive
Rockville, MD 20850

University of Maryland, Baltimore County (UMBC)
Bachelor of Science in Chemical Engineering: Traditional Track
1000 Hilltop Circle
Baltimore, Maryland 21250

Entered into this 10th day of April, 2014

Philip Rous, Ph.D.
Provost and
Vice President for Academic Affairs
University of Maryland, Baltimore County

Sanjay Rai, Ph.D.
Interim Senior Vice President for Academic Affairs
Montgomery College

Eun-Woo Chang, Ph.D.
Instructional Dean, Science, Engineering and Math
Montgomery College

Muhammad Kehnemouyi, Ph.D.
Chair, Science Engineering and Math
Montgomery College

Read and Understood

Warren DeVries, Ph.D.
Dean,
College of Engineering and Information Technology
University of Maryland, Baltimore County

Brian Reed, Ph.D.
Chair,
Chemical, Biochemical, & Environmental Engineering
University of Maryland, Baltimore County

APPROVED

UMBC
Office of General Counsel
This agreement is applicable for students enrolled at Montgomery College (MC) upon the execution date of this agreement. This agreement may be modified by the mutual written consent of both parties. This agreement may be terminated by either party by giving notice six months in advance to the other party. Such termination will not affect the participation in the articulated programs of those MC students who have been fully or conditionally admitted to UMBC.

Any notice to be given hereunder shall be given in writing by U.S. mail or via reputable overnight courier (e.g., Federal Express, DHL, etc.). Notice shall be deemed received upon delivery to the party to whom the notice is directed or to its agent, in the case of UMBC to: UMBC, 1000 Hilltop Circle, Baltimore, Maryland 21250, Attn: Dr. Philip Rous, Provost, with copies to Dr. Diane Lee, Vice Provost and Dean, Undergraduate Education, Dr. Yvette Mozie-Ross, Associate Provost, Enrollment Management, and Mr. Steven Smith, University Registrar, UMBC; and, in the case of MC to: 900 Hungerford Drive, Rockville Maryland 20850, Attn: Ms. Andrea Milo, Acting Director of Articulation, Transfer and Academic Services. Notwithstanding the foregoing, in the event that this Agreement provides that any notice must be directed to a person other than the person designated for the receipt of notice in the preceding sentence, then notice must be directed to such other person in order to be effective hereunder.

This Agreement embodies the entire agreement and understanding among the parties hereto relating to the subject matter hereof and may not be changed orally, but only by an instrument in writing signed by all parties hereto. No representation, warranty, undertaking or covenant is made by any party hereto except as contained herein and any others are specifically disclaimed. This Agreement shall be governed by and construed in accordance with the internal laws of the State of Maryland (i.e., without regard to its conflicts of law rules). This Agreement shall be binding upon the parties hereto and their respective successors, but shall not inure to the benefit of any third party beneficiary. This Agreement and any rights hereunder may not be assigned by either party without the prior written consent of the other, and any purported assignment without consent shall be null and void and of no effect whatsoever. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Agreement.

This Articulation Agreement continues on the next page.
Articulation Agreement
Montgomery College
Associate of Science in General Engineering
University of Maryland, Baltimore County (UMBC)
Bachelor of Science in Chemical Engineering: Traditional Track

This agreement is initiated this day, April 10, 2014 between Montgomery College, 900 Hungerford Drive, Rockville, MD 20850, hereafter “MC,” and the University of Maryland Baltimore County, a constituent institution of the University System of Maryland, and agency of the State of Maryland, hereafter “UMBC,” to facilitate the transfer of students earning the Associate of Science degree in General Engineering at MC to UMBC in pursuit of the Bachelor of Science degree in Chemical Engineering: Traditional Track.

I. PURPOSE

The purpose of this Articulation Agreement (the “Agreement”) is to establish a collaboration between UMBC and MC in an effort to facilitate the transfer and degree completion of students earning the Associate of Science in General Engineering at MC to the Bachelor of Science in Chemical Engineering at UMBC.

This Agreement also serves as a Memorandum of Understanding between both institutions for the purpose of clarifying roles and responsibilities in this partnership.

II. GUIDING PRINCIPLES

In consideration of the mutual covenants and conditions expressed herein, the parties agree to the following:

General Requirements

1. All courses meeting general education requirements at MC will transfer and be applied towards the general education requirements at UMBC.
2. A completed general education program shall transfer without further review or approval by UMBC and without the need for a course-by-course match.
3. A maximum of 65 credits will transfer from MC, a 2-year degree-granting institution.
4. Upon matriculation to UMBC, MC students must satisfy all general education, graduation and major requirements as outlined in the UMBC Undergraduate Catalog.
5. MC students must take a minimum of 30 credit hours at UMBC to earn a bachelor’s degree.
6. UMBC requires a minimum of 120 credit hours to attain a bachelor’s degree.

Advising/Academic Planning

1. Students should work closely with their academic advisor at MC to develop an academic plan to ensure a seamless transition.
2. Students and advisors are encouraged to utilize a variety of advising resources including the UMBC Undergraduate Catalog, Suggested Transfer Pathways, departmental websites, as well as ARTSYS (the USM online articulation database), to ascertain transferability of coursework.
Following admission to UMBC, students will receive an evaluation of prior college coursework via myUMBC. The evaluation will include a Transfer Credit Report and a Degree Audit detailing prior coursework, transferability and applicability to UMBC general and university requirements.

Prior to matriculation to UMBC, all new students are required to attend the mandatory new student orientation program. During orientation, students will meet with an academic advisor to review prior coursework, discuss academic interests and goals, and develop an academic plan. Upon matriculation, students will be assigned an advisor in their area of study. Students are strongly encouraged to meet with their advisor periodically. Students are required to meet with their advisor prior to registering for subsequent semesters.

Admissions

The UMBC Admissions Committee evaluates transfer applicants on the basis of their academic record at previous institutions. Cumulative grade point average, performance trends, strength of curriculum and performance in courses related to the intended area of study are considered. Applicants successfully completing the articulated program with a 2.0 or better grade point average who have not subsequently matriculated at any other institution of higher education will be guaranteed transfer admission to UMBC. Additional requirements may apply on selective admissions programs (e.g. Engineering, Visual Arts, Performing Arts). A history of acts identified in the Federal Campus Security Act may disqualify a candidate for guaranteed admission.

Scholarships and Financial Aid

Students transferring from MC to UMBC who meet application deadlines, academic and financial qualification that apply to all students, may be eligible for consideration for the following scholarships offered by UMBC:

a) The Academic Achievement Award for Transfers (AAAT) – awarded to community college transfers on the basis of academic accomplishment. Awards of up to $2,500 for each of two academic years of study. May be used for full- or part-time study. Students must have completed 35 or more college level credits at the time of application to be eligible for consideration.

b) Phi Theta Kappa (PTK) Scholarship – awarded to community college transfers on the basis of academic accomplishment. Awards range from $2,000 to $2,500 per year for each of two academic years of study. May be used for full- or part-time study. Students must submit proof of PTK membership to be eligible for consideration.

c) Honors College Scholarship – Transfer students admitted to the Honors College may be eligible for a $1,000 award per year for each of two years of academic study.

d) Transfer Student Alliance (TSA) - awarded Montgomery College transfers who complete the associate’s degree and meet all other program requirements. Awards of $1,500 dollars for each of two years of full-time study.

To maximize consideration for need-based aid, students are encouraged to complete the free Application for Federal Student Aid (FAFSA) as soon as possible after January 1 but prior to February 14 for fall admission.
Ongoing Collaboration

1. In the spirit of articulation, faculty representatives from both institutions will meet annually to engage in ongoing discussion to enhance and strengthen this collaboration.
2. UMBC Engineering faculty may serve as a resource as available to MC students and faculty by serving as guest lecturers, workshop/seminar facilitators and other program exchanges.
3. Partner institutions agree to communicate program changes in a timely manner to avoid disruption to student progress toward degree completion.

III. PROGRAM ARTICULATION AGREEMENT

The following details a recommended course of study for students earning the Associate of Science degree in General Engineering at MC transferring to UMBC in pursuit of the Bachelor of Science degree in Chemical Engineering. Where noted, course equivalencies, general education and major applicability are indicated.

<table>
<thead>
<tr>
<th>Montgomery College Present Course Number (Course Number as of fall 2014)</th>
<th>Montgomery College Course Title</th>
<th>Montgomery College Credits</th>
<th>UMBC Equivalency</th>
<th>UMBC General Education Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN101 (ENGL101)</td>
<td>Introduction to College Writing</td>
<td>3</td>
<td>LLE</td>
<td></td>
<td>If needed as pre-req for EN102, otherwise not required</td>
</tr>
<tr>
<td>EN102/109 (ENGL102/103)</td>
<td>Critical Reading/Writing and Research or Critical Reading/Writing and Research at Work</td>
<td>3</td>
<td>ENGL 100</td>
<td>EN</td>
<td></td>
</tr>
<tr>
<td>CH101 (CHEM131)</td>
<td>Principles of Chemistry I</td>
<td>4</td>
<td>CHEM 101</td>
<td>SL</td>
<td>Students must take both CH101 and 102 to receive CHEM101 and CHEM102+L credit</td>
</tr>
<tr>
<td>PH262 (PHYS262)</td>
<td>Electricity and Magnetism</td>
<td>4</td>
<td>PHYS 122</td>
<td>SL</td>
<td></td>
</tr>
<tr>
<td>MA181 (MATH181)</td>
<td>Calculus</td>
<td>4</td>
<td>MATH 151</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>BSSD</td>
<td>Behavioral and Social Sciences Distribution</td>
<td>3</td>
<td>SS</td>
<td>SS</td>
<td></td>
</tr>
<tr>
<td>BSSD</td>
<td>Behavioral and Social Sciences Distribution</td>
<td>3</td>
<td>SS</td>
<td>SS</td>
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<tr>
<td>HUMD</td>
<td>Humanities</td>
<td>3</td>
<td>AH or C</td>
<td>AH</td>
<td>If student completes 100</td>
</tr>
<tr>
<td>Program Requirements</td>
<td>Distribution</td>
<td>Credits</td>
<td>Prerequisites</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
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<td></td>
</tr>
<tr>
<td>HE 100 or any HE (HLTH100 or any HLTH)</td>
<td>Health Foundation</td>
<td>1</td>
<td>SS</td>
<td>SS¹</td>
<td></td>
</tr>
<tr>
<td>ARTD</td>
<td>Arts Distribution</td>
<td>3</td>
<td>AH</td>
<td>AH¹</td>
<td></td>
</tr>
<tr>
<td>Total General Requirements</td>
<td></td>
<td>28-31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Requirements</td>
<td>Principles of Chemistry II</td>
<td>4</td>
<td>CHEM 102+L</td>
<td>Students must take both CH101 and 102 to receive CHEM101 and CHEM102+L credit</td>
<td></td>
</tr>
<tr>
<td>ES100 (ENES100) and ES240 (ENES240)</td>
<td>Intro to Engineering Design and Scientific and Engineering Computation</td>
<td>6</td>
<td>ENES 101</td>
<td>Must take both ES 100 and ES 240 to receive credit for ENES101</td>
<td></td>
</tr>
<tr>
<td>MA182 (MATH182)</td>
<td>Calculus II</td>
<td>4</td>
<td>MATH 152</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA280 (MATH280)</td>
<td>Multivariable Calculus</td>
<td>4</td>
<td>MATH 251</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA282 (MATH282)</td>
<td>Differential Equations</td>
<td>3</td>
<td>MATH 225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES102 (ENES102)</td>
<td>Statics</td>
<td>3</td>
<td>ENME 110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH161 (PHYS161)</td>
<td>Mechanics and Heat</td>
<td>3</td>
<td>PHYS 121</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH203 (CHEM203)</td>
<td>Organic Chemistry I</td>
<td>5</td>
<td>CHEM351+L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH204 (CHEM204)</td>
<td>Organic Chemistry II</td>
<td>5</td>
<td>CHEM352+L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Program Requirements</td>
<td></td>
<td>37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number of Credits Required for Chemical Engineering degree</td>
<td></td>
<td>65-68</td>
<td></td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Maximum Number of Transfer Credits Applied Towards</td>
<td></td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chemical Engineering degree

These courses satisfy the general categories as indicated. To view specific course equivalency, consult ARTSYS (artsys.usmd.edu).

COMPETITIVE ADMISSION: Students are admitted to the Chemical Engineering program only when they pass the following Gateway courses with at least two B's and two C's: MATH 152 (MATH 182), and ENES 101 (ENES 100) and CHEM 102 (CHEM 132), and ENCH 215 (@UMBC). Students must also pass ENES 240 and CHEM 131 with a grade of C or better. Students are only permitted two attempts in courses for their major; a withdrawal is considered an attempt.

Upon admission, UMBC will determine the transferability of any courses not taken at MC. Students should be prepared to provide syllabi, course descriptions, exams and homework as requested.

Legend

<table>
<thead>
<tr>
<th>AH</th>
<th>Arts/Humanities</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Culture</td>
</tr>
<tr>
<td>EN</td>
<td>English Composition</td>
</tr>
<tr>
<td>L</td>
<td>Language</td>
</tr>
<tr>
<td>LL</td>
<td>Lower Level</td>
</tr>
<tr>
<td>E</td>
<td>Elective</td>
</tr>
<tr>
<td>M</td>
<td>Mathematics</td>
</tr>
<tr>
<td>PE</td>
<td>Physical Education</td>
</tr>
<tr>
<td>S</td>
<td>Science</td>
</tr>
<tr>
<td>SL</td>
<td>Science (plus lab)</td>
</tr>
<tr>
<td>SS</td>
<td>Social Sciences</td>
</tr>
</tbody>
</table>
Suggested Transfer Pathway
Montgomery College A.S. in General Engineering to UMBC’s B.S. in Chemical Engineering, Traditional Track

### Year One – Montgomery College

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH101 Principles of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>ES100 Intro to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EN101 Introduction to College Writing*</td>
<td>3</td>
</tr>
<tr>
<td>MA181 Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Arts Distribution</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14-17</strong></td>
</tr>
</tbody>
</table>

### Spring Semester 2014

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH102 Principles of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>EN109 or EN109, English Foundation</td>
<td>3</td>
</tr>
<tr>
<td>MA182 Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>ES102 Statics</td>
<td>3</td>
</tr>
<tr>
<td>PH161 Mechanics and Heat</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### Year Two – Montgomery College

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH203 Organic Chemistry I</td>
<td>5</td>
</tr>
<tr>
<td>MA280 Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>HE100 Principles of Healthier Living</td>
<td>1</td>
</tr>
<tr>
<td>PH262 Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>Behavioral and Social Sciences Distribution†</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities Distribution, language recomm††</td>
<td>3</td>
</tr>
<tr>
<td>MA282 Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>CH204 Organic Chemistry II</td>
<td>5</td>
</tr>
<tr>
<td>Behavioral and Social Sciences Distribution†</td>
<td>3</td>
</tr>
<tr>
<td>ES240 Scientific Engineering Computation</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

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Apply to graduate from Montgomery College with an Associate of Science in General Engineering

Students must enroll in ENCH 215 – Chemical Engineering Analysis and successfully complete ENCH 215 during the summer (see UMBC advisor) in order to begin the following academic year at junior standing. Please note that the gateway requirements must also be successfully completed.

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* If needed for EN102, if not no substitution required.
† Select from two different disciplines, one course must also meet MC’s Global & Cultural requirement
††All UMBC students are required to complete language at 201 level, students should plan to complete language pre-requisites unless exempt, see exceptions here: [www.umbc.edu/mil/gfrs.html](http://www.umbc.edu/mil/gfrs.html)

Students are admitted to the Chemical Engineering program only when they pass the following Gateway courses with at least two B's and two C's: MATH 152 (MA 182), and ENES 101 (ES 100)) and CHEM 102 (CH 102), and ENCH 215 (@UMBC). Students must also pass ES 240 and CH 101 with a grade of C or better.

Upon admission, UMBC will determine the transferability of any courses not taken at MC. Students should be prepared to provide syllabi, course descriptions, exams and homework as requested.

### Year Three – UMBC

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENCH 225 Chem Engr Prob Solv &amp; Exp Design</td>
<td>4</td>
</tr>
<tr>
<td>ENCH 300 Chemical Process Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 425 Transport Processes I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 301 Physical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 311L Advanced Laboratory I</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 302 Physical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 427 Transport Processes II</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 440 Chemical Engineering Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 442 Chemical Process Control &amp; Safety</td>
<td>3</td>
</tr>
<tr>
<td>Language 201††</td>
<td>4</td>
</tr>
<tr>
<td>Physical Education Elective Ω</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>17.5</strong></td>
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</table>

### Year Four - UMBC

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENCH 437L Chemical Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 444 Process Engr Economics &amp; Design</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 445 Separation Processes</td>
<td>3</td>
</tr>
<tr>
<td>ENCH XXX Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>AH GEP elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>15</strong></td>
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</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
</tr>
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<tbody>
<tr>
<td>ENCH 446 Process Engr Economics &amp; Design II</td>
<td>4</td>
</tr>
<tr>
<td>ENCH XXX Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>ENCH XXX Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>Culture GEP Elective</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education Elective Ω</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>14.5</strong></td>
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</tbody>
</table>

Ω Two activity courses are required prior to graduation (unless 30 or older, exempted based on a qualified physical disability or a military veteran).
### MC A.S. in General Engineering to UMBC B.S. in Chemical Engineering, Traditional Track
Total Credits: 65-68, Catalog Edition 13-14, Present to Summer 2014

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
<th>ID#</th>
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<tbody>
<tr>
<td><strong>Foundation Courses</strong></td>
<td></td>
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<tr>
<td>English 101*</td>
<td>COURSE</td>
<td>HRS</td>
</tr>
<tr>
<td>English Foundation</td>
<td>EN101*</td>
<td>(3)</td>
</tr>
<tr>
<td>Math Foundation</td>
<td>EN102 or EN109</td>
<td>3</td>
</tr>
<tr>
<td>Health Foundation (HLHF)</td>
<td>MA181</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>HE100</td>
<td>1</td>
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<table>
<thead>
<tr>
<th><strong>Distribution Courses</strong></th>
<th>COURSE</th>
<th>HRS</th>
<th>GRADE</th>
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</thead>
<tbody>
<tr>
<td>Arts Distribution (ARTD)</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Humanities Distribution (HUMD), language recommended ++</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Behavioral / Social Sciences Distribution (BSSD)**</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Behavioral / Social Sciences Distribution (BSSD)**</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Natural Sciences Distribution with Lab (NSLD)</td>
<td>PH262</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Natural Sciences Distribution with Lab (NSLD)</td>
<td>CH101</td>
<td>4</td>
<td></td>
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<table>
<thead>
<tr>
<th><strong>Curriculum Requirements</strong></th>
<th>COURSE</th>
<th>HRS</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanics and Heat</td>
<td>PH161</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Introduction to Engineering Design</td>
<td>ES100</td>
<td>3</td>
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</tr>
<tr>
<td>Calculus II</td>
<td>MA182</td>
<td>4</td>
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<tr>
<td>Multivariable Calculus</td>
<td>MA280</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Differential Equations</td>
<td>MA282</td>
<td>3</td>
<td></td>
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<tr>
<td>EE or ES ELECTIVE-Scientific and Engineering Computation</td>
<td>ES240</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE, ES or Science ELECTIVE-Statics</td>
<td>ES102</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE, ES or Science ELECTIVE-Organic Chemistry I</td>
<td>CH203</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>EE, ES or Science ELECTIVE-Organic Chemistry II</td>
<td>CH204</td>
<td>5</td>
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</tr>
<tr>
<td>ELECTIVE-Principles of Chemistry II</td>
<td>CH102</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Global & Cultural Perspectives Requirement: +

Total Credits: 65-68

* If needed for EN102, if not no substitution required.

** Select from two different disciplines, one course must also meet MC's Global & Cultural requirement

++ All UMBC students are required to complete language at 201 level, students should plan to complete language pre-requisites unless exempt, see exceptions here: [www.umbc.edu/mill/gfrs.html](http://www.umbc.edu/mill/gfrs.html)

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### Suggested Transfer Pathway
Montgomery College A.S. in General Engineering to UMBC’s B.S. in Chemical Engineering, Traditional Track

#### Year One – Montgomery College

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
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</thead>
<tbody>
<tr>
<td>CHEM131 Principles of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>ENES100 Intro to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL101 Introduction to College Writing*</td>
<td>3</td>
</tr>
<tr>
<td>MATH181 Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Arts Distribution</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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#### Starting Fall 2014

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
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<tbody>
<tr>
<td>CHEM132 Principles of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>ENGL102 or ENGL109, English Foundation</td>
<td>3</td>
</tr>
<tr>
<td>MATH182 Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>ENES102 Statics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS161 Mechanics and Heat</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td>17</td>
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</table>

#### Year Two – Montgomery College

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
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<tbody>
<tr>
<td>CHEM203 Organic Chemistry I</td>
<td>5</td>
</tr>
<tr>
<td>MATH280 Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>HLTH100 Principles of Healthier Living</td>
<td>1</td>
</tr>
<tr>
<td>PHYS262 General Physics II</td>
<td>4</td>
</tr>
<tr>
<td>Behavioral and Social Sciences Distribution†</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>17</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
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</thead>
<tbody>
<tr>
<td>Humanities Distribution, language recomm. ††</td>
<td>3</td>
</tr>
<tr>
<td>MATH282 Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>CHEM204 Organic Chemistry II</td>
<td>5</td>
</tr>
<tr>
<td>Behavioral and Social Sciences Distribution‡</td>
<td>3</td>
</tr>
<tr>
<td>ENES240 Scientific Engineering Computation</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>17</td>
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</tbody>
</table>

Apply to graduate from Montgomery College with an Associate of Science in General Engineering.

Students must enroll in ENCH 215 – Chemical Engineering Analysis and successfully complete ENCH 215 during the summer (see UMBC advisor) in order to begin the following academic year at junior standing. Please note that the gateway requirements must also be successfully completed.

* If needed for EN102, if not no substitution required.
† Select from two different disciplines, one course must also meet MC’s Global & Cultural requirement.
†† All UMBC students are required to complete language at 201 level, students should plan to complete language pre-requisites unless exempt, see exceptions here: [www.umbc.edu/ml1/gfrs.html](http://www.umbc.edu/ml1/gfrs.html)

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#### Year Three – UMBC

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Cr</th>
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<tbody>
<tr>
<td>ENCH 225 Chem Engr Prob Solv &amp; Exp Design</td>
<td>4</td>
</tr>
<tr>
<td>ENCH 300 Chemical Process Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 425 Transport Processes I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 301 Physical Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 311L Advanced Laboratory I</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
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</thead>
<tbody>
<tr>
<td>CHEM 302 Physical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 427 Transport Processes II</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 440 Chemical Engineering Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 442 Chemical Process Control &amp; Safety</td>
<td>3</td>
</tr>
<tr>
<td>Language 201††</td>
<td>4</td>
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<tr>
<td>Physical Education Elective</td>
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<tr>
<td><strong>Total Credits</strong></td>
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#### Year Four - UMBC

<table>
<thead>
<tr>
<th>Fall Semester</th>
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<tbody>
<tr>
<td>ENCH 437L Chemical Engineering Laboratory</td>
<td>3</td>
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<tr>
<td>ENCH 444 Process Engr Economics &amp; Design</td>
<td>3</td>
</tr>
<tr>
<td>ENCH 445 Separation Processes</td>
<td>3</td>
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<tr>
<td>ENCH XXX Engineering Elective</td>
<td>3</td>
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<td>AH GEP elective</td>
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<td><strong>Total Credits</strong></td>
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<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Cr</th>
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<tbody>
<tr>
<td>ENCH 446 Process Engr Economics &amp; Design II</td>
<td>4</td>
</tr>
<tr>
<td>ENCH XXX Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>ENCH XXX Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>Culture GEP Elective</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education Elective</td>
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<tr>
<td><strong>Total Credits</strong></td>
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Ω Two activity courses are required prior to graduation (unless 30 or older, exempted based on a qualified physical disability or a military veteran).
### Foundation Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
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<tbody>
<tr>
<td>ENGL101*</td>
<td>(3)</td>
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<tr>
<td>ENGL102* or ENGL109</td>
<td>3</td>
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</tr>
<tr>
<td>MATH181</td>
<td>4</td>
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<tr>
<td>HLTH100</td>
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### Distribution Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Arts Distribution (ARTD)</td>
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<tr>
<td>Humanities Distribution (HUMD)</td>
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<tr>
<td>Behavioral / Social Sciences Distribution (BSSD)†</td>
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<td></td>
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<tr>
<td>Behavioral / Social Sciences Distribution (BSSD)‡</td>
<td>3</td>
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<tr>
<td>Natural Sciences Distribution with Lab (NSLD)</td>
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<tr>
<td>Natural Sciences Distribution with Lab (NSLD)</td>
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### Curriculum Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>PHYS161</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENES100</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH182</td>
<td>4</td>
<td></td>
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<tr>
<td>MATH280</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MATH282</td>
<td>3</td>
<td></td>
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<tr>
<td>ENES240</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENES102</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM203</td>
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</tr>
<tr>
<td>CHEM204</td>
<td>5</td>
<td></td>
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<tr>
<td>CHEM132</td>
<td>4</td>
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### Global & Cultural Perspectives Requirement:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Notes</th>
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<tbody>
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### Total Credits:

- **65-68**

---

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† Select from two different disciplines, one course must also meet MC’s Global & Cultural requirement

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