MEMORANDUM OF UNDERSTANDING
HARFORD COMMUNITY COLLEGE & TOWSON UNIVERSITY
September 25, 2017

MATHEMATICS, Pure Mathematics Concentration B.S. Degree

Harford Community College, Bel Air, Maryland, and Towson University, agree to follow the articulation of courses outlined in the articulation (course equivalency) document, for completion of requirements for the Bachelor of Science degree in Mathematics (Pure Mathematics Concentration) (Attachment A), which is attached to, and incorporated by reference into, this Memorandum of Understanding (MOU). The following principles guide the operation of this MOU, with the requirements for transfer in specific curricula set forth in Attachment A.

1. Towson University will accept a maximum number of 64 credits from Harford Community College as outlined in the Attachment A. The number of transferable credits specific to this program is reflected in Attachment A.

2. Students who have completed the Associate of Science Degree in the Mathematics program at Harford Community College may transfer into Towson University’s Mathematics program with junior standing provided that the student has completed all courses identified on Attachment A (which is attached to, and incorporated by reference into, this MOU) with a cumulative GPA of 2.00 or higher. Courses completed at Harford Community College with 300 or 400 level Towson University course equivalencies will transfer as lower-level credit but will satisfy course content as indicated.

3. Only courses in which a grade of C (2.00) or better is earned will apply toward the major at Towson University.

4. In accordance with the MHEC transfer policy pertaining to general education requirements, Towson University will accept the completion of Harford Community College’s general education requirements (GenEds) and students will be required to complete courses at Towson University to satisfy the remaining University Core requirements as shown in Attachment A.

5. Towson University recognizes college-level experiential learning gained through previous work, military and/or volunteer service or life experience. Credit for prior learning may also be established through course challenge or standardized credit by examination.

6. Harford Community College students transferring to Towson University will be given every consideration for financial aid and will be eligible to compete for academic scholarships upon entrance to Towson University subject to stated scholarship deadlines.

7. Both Harford Community College and Towson University agree to work together to facilitate the transfer of students from Harford Community College to Towson University to work cooperatively to insure the high quality of the programs at the respective
institutions. Transfer of students will be in accordance with policies and procedures of both institutions, as they may be amended from time to time.

8. This MOU will be in effect initially for ten years, beginning fall 2017, with a review every two years by both parties. Any revisions the parties deem necessary must be evidenced in writing and signed by the authorized officials of each institution. The MOU may be terminated by either party for due cause and after adequate notice of not less than six months is given to the other party.

9. Towson University will establish procedures to provide information on the academic progress of Harford Community College students enrolled as part of this MOU.

10. This MOU, when signed, constitutes the entire agreement between the parties and supersedes all prior agreements and understandings between the parties respecting the matter hereof.

HARFORD COMMUNITY COLLEGE AND TOWSON UNIVERSITY

Dr. Steven Thomas
Vice President for Academic Affairs
Date 9.27.2017

Dr. Timothy Chandler
Provost and Vice-President for Academic Affairs
Date 10/3/17
<table>
<thead>
<tr>
<th>HARFFORD COMMUNITY COLLEGE</th>
<th>TU EQUIVALENCY</th>
<th>CORE</th>
<th>COMMENTS</th>
<th>TOWSON UNIVERSITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eng 101</strong> English Composition (GE)</td>
<td>TSEM 102 waived</td>
<td>1.</td>
<td>Towsen Seminar</td>
<td><strong>Mathematics</strong></td>
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<tr>
<td><strong>MATH 203</strong> Calculus I (GM)</td>
<td>ENGL 102</td>
<td>2.</td>
<td>English Composition</td>
<td><strong>Mathematics</strong></td>
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<tr>
<td><strong>CIS 102</strong> Introduction to Information Sciences (GI)</td>
<td>MATH 273</td>
<td>3.</td>
<td>Creativity &amp; Creative Development</td>
<td><strong>Arts &amp; Humanities</strong></td>
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<tr>
<td><strong>(GH)</strong> Arts/Humanities Elective (GH)</td>
<td>COSC 111</td>
<td>4.</td>
<td>Ryalest &amp; Creative Development</td>
<td><strong>Arts &amp; Humanities</strong></td>
</tr>
<tr>
<td><strong>(GB)</strong> Behavioral/Social Science Elective (GB)</td>
<td>Depends on choice.</td>
<td>5.</td>
<td><strong>Social &amp; Behavioral Sciences</strong></td>
<td><strong>Social &amp; Behavioral Sciences</strong></td>
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<tr>
<td><strong>PHYS 204</strong> Gen Phys: Vibrations, Waves, Heat, Electricity and Magnetism (GL)</td>
<td>Depends on choice.</td>
<td>6.</td>
<td><strong>Biological &amp; Physical Science w/lab</strong></td>
<td><strong>Biological &amp; Physical Science</strong></td>
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<tr>
<td><strong>PHYS 203/200</strong> Gen Phys: Mechanics and Particle Dynamics w/lab (GL/GS)</td>
<td>Depends on choice.</td>
<td>7.</td>
<td><strong>Biological &amp; Physical Science</strong></td>
<td><strong>Biological &amp; Physical Science</strong></td>
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<tr>
<td><strong>GEN ELECT</strong> General Education Elective</td>
<td>Depends on choice.</td>
<td>8.</td>
<td><strong>Advanced Writing Seminar</strong></td>
<td><strong>Advanced Writing Seminar</strong></td>
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<tr>
<td><strong>GEN ELECT</strong> General Education Elective</td>
<td>Depends on choice.</td>
<td>9.</td>
<td><strong>Metropolitan Perspectives</strong></td>
<td><strong>Metropolitan Perspectives</strong></td>
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<tr>
<td><strong>(GB)</strong> Behavioral/Social Science Elective (GB)</td>
<td>Depends on choice.</td>
<td>10.</td>
<td><strong>The United States as a Nation</strong></td>
<td><strong>The United States as a Nation</strong></td>
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<tr>
<td><strong>(GH)</strong> Arts/Humanities Elective (GH)</td>
<td>Depends on choice.</td>
<td>11.</td>
<td><strong>Global Perspectives</strong></td>
<td><strong>Global Perspectives</strong></td>
</tr>
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<td><strong>PHIL 205</strong> Ethics (GH)</td>
<td>Depends on choice.</td>
<td>12.</td>
<td><strong>Diversity &amp; Difference</strong></td>
<td><strong>Diversity &amp; Difference</strong></td>
</tr>
</tbody>
</table>
| Total Core in Transfer | 38-39 | | **Ethical Issues & Perspectives** | 6548**

**MATH 204** Calculus II | MATH 274 | 1-2 | Content Equivalent – transfers as lower level credit. | **MATH 274 (374)** | Content Equivalent – transfers as lower level credit. |
| **MATH 206** Calculus III | MATH 275 | 4 | Equivalency exception for this program. | **540** |
| **MATH 217** Linear Algebra | MATH 265 | 4 | | **540** |
| **MATH 208** Elementary Differential Equations | MATH 274 (374) | 5-2 | | **540** |
| **CSI 131** Computer Science I | COSC 236 | 4 | | **540** |
| **PE** Physical Education Elective | PHEA 211 | 1 | | **540** |
| **GEN ELECT** General Elective | Depends on choice. | | | **540** |

**Program Requirements at Harford**

**Total Harford Program Requirements at Harford**

**Maximum Credits in Transfer**

**64 credit transfer maximum. 3 Core Curriculum units must be completed at Towson University: Core 9: Advanced Writing Seminar**

*One GH or GB course must also satisfy the Diversity requirement at HCC.

** Students must take both PHYS 200 and PHYS 203 to receive PHYS 241 equivalent. Students who take PHYS 203 without the lab (PHYS 200) will receive an equivalent of PHYS 10T.

***Students should choose CIS 102, PHIL 205 and two additional General Education courses as their general electives to satisfy program requirements at HCC and Core requirements at TU. Students who do not take General Education courses as outlined here may have to take additional Core courses at TU.

****Requires course directive for Core placement.
HARFORD COMMUNITY COLLEGE MATHEMATICS A.S. DEGREE
TOWSON UNIVERSITY MATHEMATICS PURE MATHEMATICS CONCENTRATION B.S. DEGREE

CORE REQUIREMENTS TO BE COMPLETED AT TOWSON 3-15 UNITS

CORE 9: ADVANCED WRITING SEMINAR (3 UNITS)
CORE 4: CREATIVITY AND CREATIVE DEVELOPMENT (3 UNITS)
(If CIS 102 was not taken at HCC)
CORE 10: METROPOLITAN STUDIES (3 UNITS)
(If additional General Education course was not taken at HCC)
CORE 11: THE UNITED STATES AS A NATION (3 UNITS)
(If additional General Education course was not taken at HCC)
CORE 14: ETHICAL ISSUES AND PERSPECTIVES (3 UNITS)
(If PHIL 205 was not taken at HCC)

PROGRAM REQUIREMENTS TO BE COMPLETED AT TOWSON 45-46 UNITS

REQUIRED COURSES: 7-8 UNITS
MATH 267 INTRODUCTION TO ABSTRACT MATHEMATICS (4 UNITS)

SELECT ONE OF THE FOLLOWING:
MATH 369 INTRODUCTION TO ABSTRACT ALGEBRA (3-4 UNITS)
MATH 463 LINEAR ALGEBRA
MATH 473 INTRODUCTORY REAL ANALYSIS

COURSES FOR PURE MATHEMATICS CONCENTRATION: 38 UNITS

REQUIRED COURSES: (23 UNITS)
MATH 331 PROBABILITY
MATH 374 DIFFERENTIAL EQUATIONS
MATH 463 LINEAR ALGEBRA
MATH 467 ALGEBRAIC STRUCTURES
MATH 473 INTRODUCTORY REAL ANALYSIS
MATH 475 COMPLEX ANALYSIS
MATH 490 SENIOR SEMINAR IN MATHEMATICS

UPPER-DIVISION MATHEMATICS ELECTIVES: (15 UNITS)

SELECT AT LEAST FIVE OF THE FOLLOWING:
At least two from this group:
MATH 315 APPLIED COMBINATORICS
HARFORD COMMUNITY COLLEGE MATHEMATICS A.S. DEGREE
TOWSON UNIVERSITY MATHEMATICS PURE MATHEMATICS CONCENTRATION B.S. DEGREE

MATH 332        MATHEMATICAL STATISTICS
MATH 353        EUCLIDEAN AND NON-EUCLIDEAN GEOMETRIES
MATH 377 OR     MATHEMATICAL MODELS OR
                COMPUTATIONAL PROBABILITY MODELS (CAN CHOOSE EITHER MATH 377 OR 439, BUT NOT BOTH)
MATH 379        FOURIER ANALYSIS WITH APPLICATIONS

At least two from this group:
MATH 451        GRAPH THEORY
MATH 457        DIFFERENTIAL GEOMETRY
MATH 465        THEORY OF NUMBERS
MATH 477        TOPOLOGY

TOTAL CREDITS TO B.S. DEGREE  (120)
Harford Mathematics A.S. Degree  60
Completion of Core Curriculum at TU  3-15
Major Requirements at TU  45-46
Electives at TU  0 -12