



State University of New York

**TRANSFER ARTICULATION AGREEMENT
BETWEEN
THOMAS J WATSON SCHOOL OF ENGINEERING AND
APPLIED SCIENCE
BINGHAMTON UNIVERSITY
AND
BROOME COMMUNITY COLLEGE**

INTRODUCTION

In an effort to better serve students intending to pursue programs of study within the Watson School of Engineering and Applied Science at Binghamton University, Broome Community College and Binghamton University hereby enter into this transfer articulation agreement.

Binghamton University recognizes students from Broome Community College who complete an associate degree and then wish to pursue and earn a baccalaureate degree in the Watson School at Binghamton University.

OBJECTIVES

- **To facilitate the transition of graduates from the associate of science in engineering science at Broome Community College to baccalaureate degree programs in electrical, mechanical, industrial & systems and computer engineering in the Watson School at Binghamton University.**
- **To attract qualified students to both Broome Community College and Binghamton University.**
- **To provide information to ensure appropriate advisement for students from faculty and staff at both Broome Community College and Watson School at Binghamton University.**
- **To encourage academic coordination between the faculty and advisors at the two institutions, including curricular reviews.**
- **To assess and exchange information on the specific outcomes of this articulation program with the goal of continual improvement.**

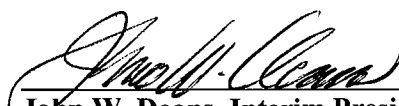
**TRANSFER ARTICULATION AGREEMENT
BETWEEN
WATSON SCHOOL
BINGHAMTON UNIVERSITY
AND
BROOME COMMUNITY COLLEGE**

In December 2009 Watson School of Binghamton University and Broome Community College agree to enter into an articulation agreement as described by articles one through six of the attached document and the Transfer Information/Curriculum Planning Guide. This articulation agreement will remain in effect until it is recertified or until it is terminated.

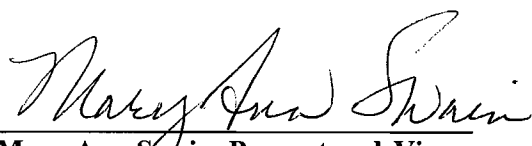
The undersigned agree to all the stipulations outlined in the attached documents.



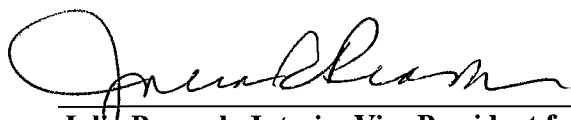
**Lois B. DeFleur, President
Binghamton University**



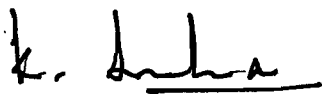
**John W. Deans, Interim President
Broome Community College**



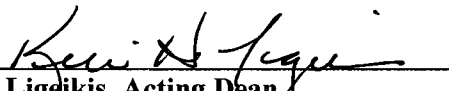
**Mary Ann Swain, Provost and Vice
President for Academic Affairs
Binghamton University**



**Julia Peacock, Interim Vice President for
Academic Affairs
Broome Community College**



**Krishnaswami Srihari, Dean
Watson School
Binghamton University**



**Kelli Ligoikis, Acting Dean
Science, Technology, Engineering and Math
Broome Community College**

ARTICLES OF ARTICULATION

1. Under the provisions of this document, all Broome Community College students who have graduated or who will graduate prior to enrollment at Binghamton with an associate of science in engineering science degree with a cumulative grade point average of at least a 3.0 will be welcomed as matriculated students in the Watson School, provided that all engineering transfer admissions criteria are met, including prerequisite courses outlined in the transfer brochure and attached transfer equivalency information. A completed application is due by February 15 for the fall admission and November 1 for spring admission. However, those who intend to complete the bachelor of science degree in four standard, full-time semesters must enter in a fall semester having completed all prerequisites required for their desired program.
2. Application Forms and requirements for application and admission are available at <http://www2.binghamton.edu/admissions/students/transfer-students.html> including additional requirements for International Applicants and Educational Opportunity Program (EOP) applicants.
3. This document, the engineering transfer brochure information, and the attached curriculum planning guides describe the requirements for the bachelor of science degrees in the Watson School. The planning guides also provide information about approved Binghamton University transfer course equivalencies that should be taken within the first two years of study at Broome Community College to fulfill University General Education and/or Watson School requirements.
4. Credits awarded through programs including Advance Placement (AP), International Baccalaureate (IB) and College Level Examination Program (CLEP) will also be considered for transfer based upon official proof of minimum required scores.
5. Each institution hereby agrees to notify the other in the event of substantive changes in a course, programs or policies at its institution that would have an impact on this agreement, including the courses and provisions herein. Broome Community College shall notify the Watson School anytime that course syllabi and/or contents are significantly altered, or if new courses should be reviewed for equivalency. Substantive changes to the degree program at Binghamton University will be reflected in the Bulletin and in the guide materials on the website, and due notification shall be made to Broome Community College. All such notification shall be made as early as reasonable.
6. Evaluation and renegotiation of this agreement will occur every 5 years. At the request of either party, a review of the contents and/or implementation of the agreement will be conducted by the institutions. Binghamton University and/or Broome Community College will give not less than one calendar year's written notice for a termination of the articulation agreement.

For additional information contact
Watson School Dean's Office 607-777-6204

The Curriculum Planning Guides are part of this agreement and are attached as pages 3-6.

Thomas J. Watson School of Engineering and Applied Science at Binghamton University
BS in Computer Engineering-Four-Year Program
 Application curriculum code: 0843

BROOME COMMUNITY COLLEGE-AS in engineering science 2009

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
Math 221	Calculus I (M)	MATH 181	Math 222	Calculus II	MATH 182
Chem 111	Chemical Principles (L)	CHM 145* see note	Phys 131	General Physics I	PHY 181
WTSN 111	Exploring Engineering I	Substitute EGR 150	WTSN 112	Exploring Engineering II (J)	Substitute EGR 151
WTSN 103	Engineering Communications I	ENG 110	WTSN 104	Engineering Communications II	ENG 111 OR 220
	General Ed Elective (P)	SUGGEST HIST 130 OR 131		General Ed Elective (G)	SUGGEST ANY HIST 155-159
	Body /Wellness	PED ACTIVITY		Body/Wellness	PED WELLNESS

Year 2

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
Math 371	Ordinary Differential Equations	MATH 282	ISE 261	Probabilistic Systems I	MATH 260 APPV'D 2006**
Phys 132	General Physics II	PHY 182	EECE 260	Electrical Circuits	EGR 285
CS 211	Program'g I for Engr	CST127	CS 212	Program'g II for Engr	CST202/CST 138
EECE 251	Digital Logic Design	CST 170	EECE 252	Computer Organization & Microprocessors	EGR 289
EECE 281	EECE Seminar I	SUBSTITUTE ENR 101/200			

Year 3

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
EECE 301	Signals & Systems		EECE 352	Computer Architecture	
EECE 315	Electronics I		EECE 387	Design Lab	
EECE 351	Digital System Design		EECE 359	Computer Networks	
Math 314	Discrete Math	MATH 250		General Ed Elective (H)	Any Humanities Course
EECE 382	EECE Seminar II				

Year 4

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
EECE 487	Senior Project I (J)		EECE 488	Senior Project II	
	Technical Elective I			Technical Elective II	
	General Ed Elective (A)	Thea, Art, Mus, Cinema, Photography		General Ed Elective (N)	Any Social Science Course
CS 350	Operating Systems			Professional Elective I	MATH 281

*Electrical and Computer Engineering (ECE) allows substitution of Chem 145/lab for Chem 111, so this is the only department where Chem 146/lab will not be required.

**MATH 260 at BCC is equal to this class but it is also possible to take this after transfer.

Thomas J. Watson School of Engineering and Applied Science at Binghamton University

BS in Mechanical Engineering-Four-Year Program

Application curriculum code: 0268

BROOME COMMUNITY COLLEGE - AS in Engineering Science major-2009

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
Math 221	Calculus I (M)	MATH 181	Math 222	Calculus II	MATH 182
Chem 111	Chemical Principles (L)	CHM 145& 146*	Phys 131	General Physics I	PHY 181
WTSN 111	Exploring Engineering I	SUBSTITUTE EGR 150	WTSN 112	Exploring Engineering II (J)	SUBSTITUTE EGR 151
WTSN 103	Engineering Communications I	ENG 110	WTSN 104	Engineering Communications II	ENG 111/220
	General Ed Elective (P)	SUGGEST HIST 130 OR 131		General Ed Elective (G)	SUGGEST ANY HIST 155-159
	Body /Wellness	PED ACTIVITY		Body/Wellness	PED WELLNESS

Year 2

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
Math 371	Ordinary Differential Equations	MATH 282	Math 323	Calculus III	MATH 281
Phys 132	General Physics II	PHY 182	ME 211	Intro to Solid Mechanics	EGR 283 STR. MATERIALS *
ME 273	Statics	EGR 281	EECE 260	Circuits (with lab)	EGR 285
	General Ed Elective (A)	ANY ART ,MUS, THEA	ME 274	Dynamics	EGR 282
				General Ed Elective (N)	ANY SOCIAL SCIENCE ¹

Transfer for Year 3

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
ME 381	Computer-Aided Engineering		ME 392	Mechanical Engineering Design	
ME 331	Thermodynamics		ME 351	Fluid Mechanics	
ME 362	Material Science	EGR 284	ME 372	Engineering Proj. Mgmt	
ME 302	Engineering Analysis		ME 391	Meas. & Instrum. Lab	
	Elective*			General Ed Elective (H)	Any Humanities Course

Year 4

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
ME 493	Senior Project I (J)		ME 494	Senior Project II	
ME 421	Mechanical Vibrations		ME 424	Control Systems in ME	
ME 441	Heat Transfer			Technical Elective	
ME 403	Engineering Computational Methods			Technical Elective	
	Technical Elective			Elective*	

¹ Any Gen Ed (Pluralism in US, Global Interdependencies, Aesthetics, or Social Science can be taken either before or after transfer either at BU or (with pre-approval) elsewhere.

*Department-approved electives allow students to tailor their program to pursue individual interests.

*For junior transfers (began 2008) both Chem 145/146 are required to use as Chem 111 for the BSME major.

*Beginning with the Fall 2008 sophomore year (fall 07 freshmen) statics and dynamics at BU were split into two courses which match BCC's 281/282. *Strength of Materials is now prerequisite for junior year 381 and 392.

Thomas J. Watson School of Engineering and Applied Science at Binghamton University
BS in Electrical Engineering-Four-Year Program

Application curriculum code: 0266

BROOME COMMUNITY COLLEGE-AS in engineering science 2009

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
Math 221	Calculus I (M)	MATH 181	Math 222	Calculus II	MATH 182
Chem 111	Chemical Principles (L)	CHM 145*	Phys 131	General Physics I (calculus-based)	PHY 181
WTSN 111	Exploring Engineering I	SUBSTITUTE EGR 150	WTSN 112	Exploring Engineering II (J)	SUBSTITUTE EGR 151
WTSN 103	Engineering Communications I	ENG 110	WTSN 104	Engineering Communications II	ENG 111 OR 220
	General Ed Elective (P)	SUGGEST HIST 130 OR 131		General Ed Elective (G)	SUGGEST ANY HIST 155-159
	Body /Wellness	PED ACTIVITY		Body/Wellness	PED WELLNESS

Year 2

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
Math 371	Ordinary Differential Equations	MATH 282	ISE 261	Probabilistic Systems I	MATH 260 OR AFTER TRANSFER
Phys 132	General Physics II	PHY 182	EECE 260	Electrical Circuits	EGR 285
CS 211	Program'g I for Engrs	CST 127	CS 212	Program'g II for Engrs	CST 202/138
EECE 251	Digital Logic Design	CST 170	EECE 252	Computer Organization & Microprocessors	EGR 289
EECE 281	EECE Seminar I	SUBSTITUTE EGR 101/200			

*****Transfer for Year 3*****

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
Math 323	Multivariable Calculus	MATH 281	EECE 387	EECE Design Lab	
EECE 315	Electronics I		EECE 323	Electromagnetics	
EECE 301	Signals and Systems		EECE 361	Control Systems	
EECE 332	Semiconductor Devices		EECE 377	Communication Systems	
EECE 382	EECE Seminar II			Professional Elective 1	

Year 4

<u>Fall</u>			<u>Spring</u>		
Course No.	Course Name	Transfer Course	Course No.	Course Name	Transfer Course
EECE 487	Senior Project I (J)		EECE 488	Senior Project II	
	Technical Elective I			Technical Elective II	
	General Education Elective (H)			Professional Elective II	
	General Education Elective (A)	Any Thea, Mus, Art, Cinema, Photography		General Education Elective (N)	Any Social Science Course

¹ MATH 260 at BCC is equal to this class. *Electrical and Computer Engineering (ECE) allows substitution of Chem 145/lab for Chem 111, so this is the only department where Chem 146/lab will not be required. If taken, Statics & Dynamics would be used in the two Professional Elective areas.

State University of New York at Binghamton
Thomas J. Watson School of Engineering and Applied Science
BS in Industrial and Systems Engineering-Four-Year Program
 -Application curriculum code: 1367

BROOME COMMUNITY COLLEGE--AS in engineering science 2009

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
Math 221	Calculus I (M)	MATH 181	Math 222	Calculus II	MATH 182
Chem 111	Chemical Principles (L)	CHM 145&146*	Phys 131	General Physics I	PHYS 181
WTSN 111	Exploring Engineering I	SUBSTITUTE EGR 150	WTSN 112	Exploring Engineering II (J)	SUBSTITUTUE EGR 151
WTSN 103	Engineering Communications I	ENG 110	WTSN 104	Engineering Communications II	ENG 111/220
	General Ed Elective (P)	SUGGEST HIST 130 OR 131		General Ed Elective (G)	ANY HIST 155-159
	Body /Wellness	PED ACTIVITY		Body/Wellness	ANY WELLNESS

Year 2

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
Math Elective*	*Math Elective – student must take either Math 371 - Ordinary Differential Equations or Math 323 - Calculus III	MATH 281 or MATH 282	Math 304***	Linear Algebra	MATH 264***
Phys 132	General Physics II	PHYS 182	ISE 261	Probabilistic Systems I	MATH 260
ME 273	Statics	EGR 281 **	ISE 212	Engr'g Computing	CST 127/138
ISE 231	Human Factors	Take after transfer		Gen Ed Elective (A)	Mus/Art/Thea/Cinema

*****Year 3*****

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
ISE 311	Enterprise Systems		ISE 320	Optimization & Operatns Res I	
ISE 362	Probabilistic Syst II		ISE 363	Designing with Experiments	
ISE 370	Industrial Automation		ISE 364	Engineering Economics & Project Management.	
	Technical Elective (ISE,ME,EECE,CS,BE)	EGR 282**		Gen Ed Elective (H)	Any Humanities Course

Year 4

<u>Fall</u>			<u>Spring</u>		
BU Course No.	Course Name	Transfer Course	BU Course No.	Course Name	Transfer Course
ISE 420	Optimizatn&Operatns Res II		ISE 492	Systems Design Project	
ISE 421	Modeling and Simulation			Technical Elective (ISE, ME, EECE, CS, BE)	
ISE 491	Systems Design			Technical Elective (ISE, ME, EECE, CS, BE)	
	Free Elective	MATH 281*** OR MATH 282		Gen Ed Elective (N)	Any Social Science

*For junior transfers in 2008 (Fall 07 freshmen) both Chem 145/146 are required to use as Chem 111 for the ISE major
 **Beginning with the Fall 2008 sophomore year at BU statics and dynamics at BU was split into two courses. ISE majors are now only required to complete statics. However, dynamics can be used as a technical elective if desired.
 ***Linear Algebra is now required for this major, Calculus 3 or differential equations can be used as free elective if both are taken..

Junior-Level Transfer Admission-2009

For admission into junior-level engineering, you should have completed coursework in the subjects listed below, including the specific courses required for junior status in your particular Watson School major (see Major Notes). All transfer credits are awarded on a course-by-course basis. It is important to follow all guidelines as noted.

- Calculus I and II, differential equations and one other math (depending on major)
- Two semesters of calculus-based physics
- One course in college chemistry and additional work in science/math (depending on major)
- Two courses in English composition or technical writing
- Two college courses in humanities/social science (see General Education Notes)
- First course in electrical circuits
- Introductory programming course

Major Notes

Electrical or Computer Engineering

Select the following courses within your associate degree:

- Probability and Statistics
- Data Structures and Algorithms
- Microprocessors
- Digital Logic

Industrial and Systems Engineering

Select the following courses within your associate degree:

- Chemistry II
- Probability and Statistics
- Engineering Statics
- Microeconomics

Mechanical Engineering

Select the following courses within your associate degree:

- Chemistry II
- Calculus III
- Engineering Statics
- Engineering Dynamics
- Strength of Materials

General Education Notes

Social science electives prior to junior-level transfer should cover one U.S. history, one world history or one additional social science (preferably economics) to efficiently meet Binghamton University's General Education requirements. Foreign language is waived for engineering majors only.