

# **Academic Credit Agreement**

## **Old Dominion University**

- **BS in Business Administration (Management)**
- **BS in Electrical Engineering Technology**
- **BS in Mechanical Engineering Technology**
- **BS in Occupational & Technical Studies– Industrial Technology**
- **BS in Electrical Engineering**
- **BS Mechanical Engineering**
- **BS Modeling and Simulation Engineering**



Thomas Nelson Community College A.A.S. MECHANICAL ENGINEERING TECHNOLOGY SPECIALIZATION: MARINE ENGINEERING 956-01 2013-2014		The Apprentice School MET - Marine Engineering Program Requirements		Old Dominion University BS Mechanical Engineering Technology	
TNCC GENERAL EDUCATION COURSES		NNAS MET Program Requirements		ODU Course Equivalents	
Course#	Course Title	Credit			Credit
ENG 111	College Composition I	3	E111 (TNCC)	ENGL 110C (Gen Ed Written Communication)	3
ENG 115	Technical Writing	3	C232 (NNAS)	ENGL 231C (Gen Ed Written Communication)	3
---	Humanities Elective	3	E126 or P220 (TNCC)	ENG 112L (Gen Ed Literature) or PHI 230E (Gen Ed Philosophy)	3
---	Social Science Elective	3	H121 (TNCC)	HIS 104H (Gen Ed Interpreting the Past)	3
ECO 201	Principles of Economics I	3	E201 (TNCC)	ECO 201S (Gen Ed Human Behavior)	3
MTH 163	Precalculus I	3	M163 (TNCC)	MTH 162M	3
MTH 164	Precalculus II	3	M165 (TNCC)	MTH 163	3
PHY 201	General College Physics I	4	P222 (NNAS) + P221 (NNAS) + P199 (TNCC)	PHYS 111N (Gen Ed Science)	3
PHY 202	General College Physics II	4	P202 (TNCC)	PHYS 112N (Gen Ed Science)	4
HLT/PEd	Health or Physical Education Elective(s)	1	H210 (TNCC) or Apprentice School Athletics (NNAS) or Military		4
SDV 100	College Success Skills	1	S100 (TNCC)	HLTH 2ELE UNIV 100	1
Total General Education Course Credits		31		Total General Education Course Credits	31

MAJOR AND OTHER COURSES		NNAS MET Program Requirements		ODU Course Equivalents	
Course #	Course Title	Credit			Credit
CHM 111	College Chemistry	4	C221 (TNCC)	CHEM 121N/CHEM 122N	4
CAD 151	Engineering Drawing Fundamentals I	3	D113 (NNAS) + 40 hrs CAD Training (NNAS)	MET 120	3
CAD 241	Parametric Solid Modeling	4	D241 or D211	MET 240	4
MAR 120	Introduction to Ship Systems <sup>1</sup>	3	M111 (NNAS) + N222 (NNAS)	ENGN 110	2
MAR 211	Naval Architecture <sup>1</sup>	3	N236 (NNAS)	ENGT 111	2
MAR 212	Naval Architecture II <sup>1</sup>	3	N237 (NNAS)	MET 200	3
MEC 113	Materials and Processes of Industry	3	M113 (TNCC)	CET 200	3
MEC 131	Mechanics I-Statics for Engineer Tech	3	M131 (TNCC)	CET 220	3
MEC 132	Mechanics II-Strength of Materials for Engineering Technology	3	M132 (TNCC)	MAATH 211	4
MTH 173	Calculus with Analytic Geometry I	4	M173 (TNCC)	STEM 221/231 (Course Substitution)	3
---	Elective	3	D243	MET 225	1
N/A <sup>1</sup>			Apprenticeship Completion (NNAS)- OJT & Trades Experience	COMM 101R	3
CST 100 <sup>1</sup>	Principles of Public Speaking	3	C243 (NNAS)		3
Total Major and Other Course Credits		39			35
Total Minimum Credits		67		NNAS MET Program Total Transfer Credits	66

REMAINING ODU GENERAL EDUCATION COURSES (required)		NNAS MET Program Requirements		ODU Course Equivalents	
Human Creativity: Fine & Performing Arts <sup>1</sup>		Credit	N/A		3
		Refer to ODU Undergraduate Catalog for course options			

The lower division general education Language and Culture requirements will be satisfied by completion of all courses outlined in this program agreement.

Philosophy and Ethics, Information Literacy and Research and Impact of Technology are met through the major.

\*Student must earn C or better for course to transfer.

To participate in this articulation agreement please visit Old Dominion University's website to complete The Letter of Intent: <http://uc.odu.edu/advising/transfer/letterofintent.shtml>

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Additional Old Dominion University Requirements			
EET	350	Fund. of Electrical Tech.	3
EET	355	Electrical Laboratory	1
MET	300	Thermodynamics	3
MET	310	Dynamics	3
MET	320	Design of Machine Elements	3
EET	305	Adv. Technical Analysis	3
MET	330	Fluid Mechanics	3
MET	335W	Fluid Mechanics Laboratory	1
MET	350	Thermal Applications	3
MET 370 & 386		Automation and Controls & Automation and Controls Lab	4
ENMA	480	Ethics and Philosophy in Engineering Applications	3
MET	387	Power and Energy Laboratory	2
MET	434	Intro to Senior Project	1
ENGN	401	Fund. of Engineering Review	1
MET	435W	Senior Design Project (grade of C or better required)	3
Senior Electives		(MET)	12
Minor	Students must select from any minor in either the College of Engineering and Technology or the College of Sciences		12
Total Credits to be Taken at ODU			61
Total Transfer Credits			100
Total Credits for Degree at ODU			161

SUMMARY

All 100/200-level required math, science and engineering technology courses must be completed with a C or better prior to enrollment in any 300-level engineering technology courses.

*James H. Hughes* 11-11-13  
Signature Date

Dr. Jim Hughes  
Manager, Trainer  
Apprentice School

*[Signature]* 12/11/13  
Signature Date

ODU Department Chair

*Everett Jordan* 11-11-13  
Signature Date

Everett Jordan  
Director of Education  
Apprentice School

*[Signature]* 12/11/13  
Signature Date

Dr. Brian Payne  
Vice Provost, Academic Programs  
Old Dominion University

Thomas Nelson Community College A.A.S. ELECTRICAL ENGINEERING TECHNOLOGY SPECIALIZATION: ELECTRICAL ENGINEERING TECHNOLOGY 981-04 2013-2014			The Apprentice School EET - Electrical Engineering Tech Program Requirements		Old Dominion University BS Electrical Engineering Technology	
TNCC GENERAL EDUCATION COURSES			NNAS EET Program Requirements		ODU Course Equivalents	
Course#	Course Title	Credit				Credit
ENG 111	College Composition I	3	E111 (TNCC)		ENGL 110C (Gen Ed Written Communication)	3
ENG 112 or ENG 115	College Composition II or Technical Writing	3				
---	Humanities Elective	3	C232 (NNAS)		ENGL 231C (Gen Ed Written Communication)	3
---	Social Science Elective	3	E126 or P220 (TNCC)		ENGL 121L (Gen Ed Literature) or PHI 230E (Gen Ed Philosophy)	3
---	Social Science Elective	3	H121 (TNCC)		HIS 104H (Gen Ed Interpreting the Past)	3
MTH 163	Precalculus I	3	E201 (TNCC)		ECO 201S (Gen Ed Human Behavior)	3
MTH 164	Precalculus II	3	M163 (TNCC)		MTH 162M	3
MTH 173	Calculus with Analytic Geometry I	4	M165 (TNCC)		MTH 163	3
PHY 201	General College Physics I	4	M173 (TNCC)		MATH 211	4
PHY 202	General College Physics II	4	P222 (NNAS) + P221 (NNAS) + P199 (TNCC)		PHYS 111N (Gen Ed Science)	4
HLT/PED	Health or Physical Education Elective(s) <sup>1</sup>	1	P202 (TNCC)		PHYS 112M (Gen Ed Science)	4
SDV 100	College Success Skills	1	HLT 210/H210 (TNCC) or Apprentice School Athletics (NNAS) or Military		HLTH 2E1E	1
	<b>Total General Education Course Credits</b>	<b>35</b>	S100 (TNCC)		UNIV 100	1
<b>MAJOR AND OTHER COURSES</b>					<b>Total General Education Course Credits</b>	<b>35</b>
Course #	Course Title	Credit				
ELE 239	Programmable Controllers	3	X313 + X316 (NNAS)		STEM 242	
ETR 104	Electronic Fundamentals with Computer Applications	4			ENGL 1E1E	3
ETR 113	DC and AC Fundamentals I	4	X311 + X312 + X313 (NNAS)		EET 140, EET 205	4
ETR 114	DC and AC Fundamentals II	4			EET 208	4
ETR 148	Amplifiers and Integrated Circuits	4	X314A (NNAS)		EET 210, EET 225	4
ETR 231	Principles of Lasers & Fiber Optics I	3	E231 (TNCC)		ENGL 2E1E	4
ETR 250	Solid State Devices	4	X314B (NNAS)		EET 220, EET 225	3
ETR 261	Microprocessor Application I	4	E262 (TNCC)		ENGL 2E1E	4
ETR 279	Digital Principles, Terminology and Applications	4	E279 (TNCC)		EET 120, EET 125	4
	<b>Total Major and Other Course Credits</b>	<b>34</b>				
	<b>Total Minimum Credits</b>	<b>69</b>			<b>Total Minimum Credits</b>	<b>69</b>
<b>ADDITIONAL TRANSFERABLE COURSES</b>					<b>ODU Course Equivalents</b>	
MAR 211 <sup>2</sup>	Naval Architecture I	3	NNAS EET Program Requirements		ENGL 110	2
MAR 212 <sup>2</sup>	Naval Architecture II	3	N236 (NNAS)		ENGL 111	2
CST 100 <sup>2</sup>	Principles of Public Speaking	3	N237 (NNAS)		COMM 101R	3
CHM 111 <sup>2</sup>	College Chemistry	4	C243 (NNAS)		CHEM 121M/CHEM 121N	4
			C221 (TNCC)			
					<b>NNAS EET Program Total Transfer Credits</b>	<b>80</b>
<b>REMAINING ODU GENERAL EDUCATION COURSES</b>						
	Human Creativity: Fine & Performing Arts <sup>3</sup>	3	NNAS		ODU Course Equivalent	
			N/A		Refer to ODU Undergraduate Catalog for course options	3

The lower division general education Language and Culture requirements will be satisfied by completion of all courses outlined in this program agreement.

Philosophy and Ethics, Information Literacy and Research and Impact of Technology are met through the major.

\*Must earn C or better for course to transfer.

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Additional Old Dominion University Requirements			
EET	300	Advanced Circuit Analysis	3
EET	305	Advanced Technical Analysis	3
EET	310	Digital Electronics	3
EET	315	Digital Electronics Laboratory	2
EET	360	Electrical Power and Machinery	3
EET	365W	Electrical Power and Machinery Laboratory	2
EET	320	Microprocessors and Microcontrollers	3
EET	325	Microprocessor Laboratory	2
EET	330	Linear Electronics	3
EET	312	Wireless Communications	4
EET	335	Linear Electronics Laboratory	2
EET	434	Introduction to Senior Project	1
EET	370T	Energy and the Environment	3
EET	480W	Senior Project (Grade of C or better required)	3
ENMA	480	Ethics and Philosophy in Engineering Applications	3
Senior Electives		(EET)	6
Minor	Students must select from any minor in either the College of Engineering and Technology or the College of Sciences.		12
<b>Total Credits to be Taken at ODU</b>			<b>58</b>
<b>Total Transfer Credits</b>			<b>83</b>
<b>Total Credits to be Taken at ODU</b>			<b>58</b>
<b>Total Credits for Degree at ODU</b>			<b>141</b>

**SUMMARY**

James M. Hughes 11-11-13  
Signature Date

Dr. Jim Hughes  
Manager, Trainer  
Apprentice School

[Signature] 10/21/13  
Signature Date

ODU Department Chair

Robert Young 11-11-13  
Signature Date

Dr. Robert Young  
Vice President of Instruction and Student Services  
Blue Ridge Community College

[Signature]  
Signature Date

Dr. Brian Payne  
Vice Provost, Academic Programs  
Old Dominion University

Tidewater Community College A.S. ENGINEERING 831 2013-2014		The Apprentice School Electrical Engineering Program Requirements		Old Dominion University BS Electrical Engineering	
TNCC GENERAL EDUCATION COURSES		NNAS Elec Engineering Program Requirements		ODU Course Equivalents	
Course#	Course Title	Credit			Credit
ENG 111	College Composition I	3	E111 (TNCC)		
ENG 112	College Composition II	3	C232 (NNAS) (Course Substitution)		
---	Humanities/Fine Arts Elective	3	ENG 125/E126 (TNCC)		3
---	Humanities/Fine Arts Elective	3	PHI 220/P220 (TCC)		3
---	History Elective	3	HIS 124/H124 (TNCC)		3
---	Social Science Elective	3	ECO 203/E203 (TNCC)		3
MTH 173	Calculus with Analytic Geometry I	4	M173 (TNCC)		3
MTH 174	Calculus with Analytic Geometry II	4	M174 (TCC)		4
CHM 111	College Chemistry	4	C221 (TCC)		4
CHM 112	College Chemistry	4	C222 (TCC)		4
HLT/PEP	Health or Physical Education Elective(s) <sup>1</sup>	1	HLT 210/H210 (TNCC) or Apprentice School Athletics (NNAS) or Military		4
SDV 101	College Success Skills	1	SDV 100/S100 (TNCC)(Course Substitution)		2
Total General Education Course Credits		36			37

MAJOR AND OTHER COURSES		Total General Education Course Credits	
Course #	Course Title	Credit	
PHY 241	University Physics I	4	P241 (TCC)
PHY 242	University Physics II	4	P242(TCC)
MTH 277	Vector Calculus	4	M277 (TCC)
MTH 279	Ordinary Differential Equations	4	M279(TCC)
EGR 110	Engineering Graphics	3	E110(TCC)
EGR 120	Introduction to Engineering	2	E120(TCC)
EGR 125	Intro to Engineering Methods (C++)	4	E125(TCC)
---	Engineering Elective	3	EGR 140/E140 (TCC)
---	Engineering Elective	3	EGR 260/E260 (TCC)
---	Engineering Elective	4	EGR 270/E270 (TCC)
Total Major and Other Course Credits		35	
Total Minimum Credits		71	

ADDITIONAL TRANSFER COURSES		NNAS Elec Engineering Program		ODU Course Equivalents	
Course #	Course Title	Credit			Credit
MTH 163 <sup>1</sup>	Precalculus I	3	M163 (TNCC)		3
MTH 164 <sup>2</sup>	Precalculus II	3	M165 (TNCC)		3
CST 100 <sup>2</sup>	Principles of Public Speaking	3	C243 (NNAS)		3
EGR 261 <sup>2</sup>	Signals and Systems	3	E261 (TCC)		3
EGR 262 <sup>2</sup>	Fundamental Circuits Laboratory	2	E262 (TCC)		2
Total Major and Other Course Credits		35			33

<sup>1</sup> AS Engineering requires HLT/PEP (1). NNAS Elec Engineering program requires HLT 210 (2).  
<sup>2</sup> Not required by TCC for the AS Engineering, but satisfied by NNAS Elec Engineering program requirements.  
 NOTE: Completed Virginia community college AS satisfies all lower-level General Education requirements and results in a waiver for the Language and Culture requirement.

The lower division general education Language and Culture, and Human Creativity requirements will be satisfied by completion of all courses outlined in this program agreement.

Information Literacy and Research and Impact of Technology are met through the major.

\*Student must earn C or better for course to transfer.

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Additional Old Dominion University Requirements			
ECE	302	Linear Systems	3
ECE	303	Introduction to Electrical Power	3
ECE	313	Electronic Circuits	4
ECE	323	Electromagnetics	3
ECE	332	Mirco. Materials and Processes	3
ECE	381	Introduction to Discrete-time signal processing	3
ECE	304	Probability, Statistics, and Reliability	3
ECE	387	Microelectronics Fabrication Laboratory	3
ECE	485W	Electrical Engineering and Design I	3
ECE	486	Preparatory ECE Senior Design II	2
ECE Technical Elective			12
ENMA	480	Mechanical Engineering Design II	3
ECE	487	Project Design and Management	2
Upper Division General Education			6
<b>Total Credits to be Taken at ODU</b>			<b>53</b>
<b>Total Transfer Credits from Community College</b>			<b>84</b>
<b>Total Credits for Degree at ODU</b>			<b>137</b>

**SUMMARY**

Jim Hughes 11-11-13  
 Signature Date

Dr. Jim Hughes  
 Manager, Trainer  
 Apprentice School

[Signature] 10/1/13  
 Signature Date

ODU Department Chair

Everett Jordan 11-11-13  
 Signature Date

Everett Jordan  
 Director of Education  
 Apprentice School

[Signature] [Date]  
 Signature Date

Dr. Brian Payne  
 Vice Provost, Academic Programs  
 Old Dominion University

Tidewater Community College A.S. ENGINEERING BS1 2012-2013		The Apprentice School Mechanical Engineering Program Requirements		Old Dominion University BS Mechanical Engineering	
TNCC GENERAL EDUCATION COURSES		NNAS Mech Engineering Program Requirements		ODU Course Equivalents	
Course#	Course Title	Credit			Credit
ENG 111	College Composition I	3	E111 (TNCC)	ENGL 110C (Gen Ed Written Communication)	3
ENG 112	College Composition II	3	C232 (NNAS) (Course Substitution)	ENGL 231C (Gen Ed Written Communication)	3
---	Humanities/Fine Arts Elective	3	ENG 125/E126 (TNCC)	ENGL 112L (Gen Ed Literature)	3
---	Humanities/Fine Arts Elective	3	PHI 220/P220 (TCC)	PHI 230E (Gen Ed Philosophy)	3
---	History Elective	3	HIS 121/H121 (TNCC)	HIS 104H (Gen Ed Interpreting the Past)	3
---	Social Science Elective	3	E201 (TNCC)	ECO 201S (Gen Ed Human Behavior)	3
MTH 173	Calculus with Analytic Geometry I	4	M173 (TNCC)	MATH 211	3
MTH 174	Calculus with Analytic Geometry II	4	M174 (TCC)	MATH 212	4
CHM 111	College Chemistry	4	C221 (TCC)	CHEM 121W/CHEM 122N	4
CHM 112	College Chemistry	4	C222 (TCC)	CHEM 123W/CHEM 124H	4
HLT/PED	Health or Physical Education Elective(s) <sup>1</sup>	1	HLT 210/H210 (TNCC) or Apprentice School Athletics (NNAS) or Military	HLTH 2ELE	1
SDV 101	College Success Skills	1	SDV 100/S100 (TNCC)(Course Substitution)	UNIV 100	1
Total General Education Course Credits		36		Total General Education Course Credits	36

MAJOR AND OTHER COURSES		Total Minimum Credits	
Course #	Course Title	Credit	
PHY 241	University Physics I	4	PHY 231N
PHY 242	University Physics II	4	PHY 232N
MTH 277	Vector Calculus	4	MATH 312
MTH 279	Ordinary Differential Equations	4	MATH 307
EGR 110	Engineering Graphics	3	MAE 111
EGR 120	Introduction to Engineering	2	ENGN 110
EGR 125	Intro to Engineering Methods (C++)	4	CS 150
---	Engineering Elective	3	MAE 204
---	Engineering Elective	3	MAE 205
---	Engineering Elective	3	MAE 210, MAE 225
Total Major and Other Course Credits		34	
Total Minimum Credits		70	

ADDITIONAL TRANSFER COURSES		ODU Course Equivalents	
Course	Credit		
MTH 163 <sup>1</sup>	Precalculus I	3	MTH 162M
MTH 164 <sup>2</sup>	Precalculus II	3	MTH 163
CST 100 <sup>2</sup>	Principles of Public Speaking	3	COMM 101R
CAD 151 <sup>2</sup>	Engineering Drawing Fundamentals I	3	MET 120

1 AS Engineering requires HLT/PED (1). NNAS Mech Engineering program requires HLT 210 (2).  
 2 Not required by TCC for the AS Engineering, but satisfied by NNAS Mech Engineering program requirements.  
 NOTE: Completed Virginia community college AS satisfies all lower-level General Education requirements and results in a waiver for the Language and Culture, and Human Creativity requirements.



The lower division general education Language and Culture, and Human Creativity requirements will be satisfied by completion of all courses outlined in this program agreement.

Information Literacy and Research and Impact of Technology are met through the major.

\*Student must earn C or better for course to transfer.

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Additional Old Dominion University Requirements			
MAE	201	Materials Science	3
MAE	203	Materials Science lab	1
MAE	303	Mechanics of Fluids	3
MAE	305	Mechanical Engineering Lab III	1
MAE	311	Thermodynamics I	3
MAE	340	Computational Methods	3
MAE	312	Thermodynamics II	3
MAE	332	Mechanical Engineering Design	3
MAE	315	Heat and Mass Transfer	3
ENGN	401	Fundamentals Engineering Review	1
MAE	433	Mechanical Engineering Design II	3
MAE	434W	Project Design and Management	3
MAE	436	Dynamic Systems and Control	3
MAE		Option Courses (3)	9
MAE	435	Project Design and Management II	3
Upper Division General Education			6
<b>Total Credits to be Taken at ODU</b>			<b>51</b>
<b>Total Transfer Credits from Community College</b>			<b>82</b>
<b>Total Credits for Degree at ODU</b>			<b>133</b>

**SUMMARY**

James H. Hughes 11-27-13  
 Signature Date

Dr. Jim Hughes  
 Manager, Trainer  
 Apprentice School

[Signature] 11/13/13  
 Signature Date

ODU Department Chair

Verett Jordan 11-27-13  
 Signature Date

Verett Jordan  
 Director of Education  
 Apprentice School

[Signature] 11/13/13  
 Signature Date

Dr. Brian Payne  
 Vice Provost, Academic Programs  
 Old Dominion University

Tidewater Community College A.S. ENGINEERING 831 2013-2014		The Apprentice School Modeling and Simulation Program Requirements	Old Dominion University BS Modeling and Simulation Engineering
TNCC GENERAL EDUCATION COURSES		NNAS Mod & Sim Engineering Program Requirements	ODU Course Equivalents
Course#	Course Title	Credit	Credit
ENG 111	College Composition I	3	ENGL 110C (Gen Ed Written Communication)
ENG 112	College Composition II	3	ENGL 231C (Gen Ed Written Communication)
---	Humanities/Fine Arts Elective	3	ENGL 112L (Gen Ed Literature)
---	Humanities/Fine Arts Elective	3	HC 18EQ (Gen Ed Human Creativity)
---	History Elective	3	HIS 104H (Gen Ed Interpreting the Past)
---	Social Science Elective	3	ECO 201S (Gen Ed Human Behavior)
MTH 173	Calculus with Analytic Geometry I	4	MATH 211
MTH 174	Calculus with Analytic Geometry II	4	MATH 212
CHM 111	College Chemistry	4	CHEM 121N/CHEM 122N
CHM 112	College Chemistry	4	CHEM 123N/CHEM 124N
HLT/PED	Health or Physical Education Elective(s) <sup>1</sup>	1	MLTH 2ELE
SDV 101	College Success Skills	1	UNIV 100
Total General Education Course Credits		36	Total General Education Course Credits
<b>MAJOR AND OTHER COURSES</b>			
Course #	Course Title	Credit	
PHY 241	University Physics I	4	PHY 231N
PHY 242	University Physics II	4	PHY 232N
MTH 277	Vector Calculus	4	CS 250
MTH 279	Ordinary Differential Equations	4	MATH 280
EGR 110	Engineering Graphics	3	MSIM 111
EGR 120	Introduction to Engineering	2	ENGN 110
EGR 125	Intro to Engineering Methods (C++)	4	CS 150
---	Engineering Elective	3	MSIM 201
---	Engineering Elective	3	MSIM 205/281
---	Engineering Elective	3	ECE 241 (does not satisfy MSIM requirements)
Total Major and Other Course Credits		34	
Total Minimum Credits		70	

Tidewater Community College A.S. ENGINEERING 831 2013-2014		The Apprentice School Modeling and Simulation Program Requirements	Old Dominion University BS Modeling and Simulation Engineering
ADDITIONAL TRANSFER COURSES		NNAS Mod & Sim Engineering Program Requirements	ODU Course Equivalents
Course #	Course Title	Credit	Credit
MTH 163 <sup>2</sup>	Precalculus I	3	MTH 162M
MTH 164 <sup>2</sup>	Precalculus II	3	MTH 163
CST 100 <sup>1</sup>	Principles of Public Speaking	3	COMM 101R
Total Minimum Credits		70	

Tidewater Community College A.S. ENGINEERING 831 2013-2014		The Apprentice School Modeling and Simulation Program Requirements	Old Dominion University BS Modeling and Simulation Engineering
ADDITIONAL TRANSFER COURSES		NNAS Mod & Sim Engineering Program Requirements	ODU Course Equivalents
Course #	Course Title	Credit	Credit
MTH 163 <sup>2</sup>	Precalculus I	3	MTH 162M
MTH 164 <sup>2</sup>	Precalculus II	3	MTH 163
CST 100 <sup>1</sup>	Principles of Public Speaking	3	COMM 101R
Total Minimum Credits		70	

1 AS Engineering requires HLT/PED (1). NNAS M&S Engineering program requires HLT 230 (2).  
 2 Not required by TCC for the AS Engineering, but satisfied by NNAS M&S Engineering program requirements.

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Philosophy and Ethics, Information Literacy and Research and Impact of Technology are met through the major.

\*Student must earn C or better for any course to transfer.

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Additional Old Dominion University Requirements			
CS	252	Intro to Unix	1
STAT	330	Probability and Statistics	3
CS	330	Object Oriented Programming and Design	3
CS	381	Discrete Math	3
MSIM	320	Continuous Simulation	3
MSIM	382	Continuous Simulation Laboratory	1
Approved Program Electives (2)			6
MSIM	331	Simulation Software Design	3
MSIM	383	Simulation Software Design Laboratory	1
MSIM	410	Model Engineering	3
MSIM	451	Analysis for Modeling and Simulation	3
MSIM	441	Computer Graphics and Simulation	3
Upper Division General Electives (2)			6
MSIM	487W	Capstone Design I	4
ENMA	401	Project Management	3
Approved MSIM Technical Electives I&II			6
ENMA	480	Ethics and Philosophy in Engineering Applications	3
MSIM	488	Capstone Design II	3
Impact of Technology (Department Requirement)			3
<b>Total Credits to be Taken at ODU</b>			<b>61</b>
<b>Total Transfer Credits from Community College</b>			<b>79</b>
<b>Total Credits for Degree at ODU</b>			<b>140</b>

SUMMARY

*James N. Hughes* 11-11-13  
Signature Date

Jim Hughes  
Manager, Trainer  
Prentice School

*Rick McKenzie* 10/1/2013  
Signature Date

Dr. Rick McKenzie  
Chair  
Department of Modeling, Simulation and  
Visualization Engineering  
Old Dominion University

*Errett Jordan* 11-11-13  
Signature Date

Errett Jordan  
Director of Education  
Prentice School

*Brian Payne*  
Signature Date

Dr. Brian Payne  
Vice Provost, Academic Programs  
Old Dominion University

Thomas Nelson Community College A.S. BUSINESS ADMINISTRATION 213 2013-2014		The Apprentice School Business Administration Program Requirements		Old Dominion University BS Business Administration (Management)	
TNCC GENERAL EDUCATION COURSES		Business Admin Program Requirements		ODU Course Equivalents	
Course#	Course Title	Credit			Credit
ENG 111	College Composition I	3	E111 (TNCC)	ENGL 110C (Gen Ed Written Communication)	3
ENG 112	College Composition II	3	E112 (TNCC)	ENGL 211C (Gen Ed Written Communication)	3
CST 100	Principles of Public Speaking	3	C243 (NNAS)	COMM 101R (Required by the College of Business and Public Administration)	3
---	Humanities/Fine Arts Elective	3	ENG 125/E126	ENGL 112L (Gen Ed Literature)	3
---	Humanities/Fine Arts Elective	3	Fine Arts elective (TNCC)	HC 100C	3
HIS	History I	3	HIS 121/H121 (TNCC)	HIST 104H (Gen Ed Interpreting the Past)	3
HIS	History II	3	HIS 122/H122 (TNCC)	HIST ELE	3
MTH	Mathematics I	3	MTH 163/M163 (TNCC)	MATH 162M	3
MTH	Mathematics II	3	MTH 270/M270 (TNCC)	MATH 200	3
---	Laboratory Science I	4	P222 (NNAS) + P221 (NNAS) + PHY 199/P199 (TNCC)	PHYS 111N (Gen Ed Science)	3
---	Laboratory Science II	4	PHY 202/P202 (TNCC)	PHYS 112N (Gen Ed Science)	4
HLT/PEd	Health or Physical Education Elective(s) <sup>1</sup>	1	HLT 210/H210 (TNCC) or Apprentice School Athletics (NNAS) or Military	HLTH 2ELE	1
SDV 100	College Success Skills	1	SDV 100/S100 (TNCC)	UNIV 100	1
Total General Education Course Credits		37		Total General Education Course Credits	37

MAJOR AND OTHER COURSES		Business Admin Program Requirements		ODU Course Equivalents	
Course #	Course Title	Credit			Credit
ACC 211	Principles of Accounting I	3	A211 (TNCC)	ACCT 201	3
ACC 212	Principles of Accounting II	3	A212 (TNCC)	ACCT 202	3
ECO 201	Principles of Economics I	3	E201 (TNCC)	ECO 201S (Gen Ed Human Behavior)	3
ECO 202	Principles of Economics II	3	E202 (TNCC)	ECO 202S (Gen Ed Human Behavior)	3
BUS 200	Principles of Management	3	B112 + B122 (NNAS)	BUS 2ELE (Free Elective)	3
BUS ELE	Elective	3	B215 (NNAS)	BUS 2ELE (Free Elective)	3
---	Elective	3	BUS 216/B216 (TNCC)	BMAL 200 (Probability, Decision Analysis, and Business Statistics)	3
---	Elective	3	BUS 209/B209 (TNCC)	BUS 2ELE (Free Elective)	3
Total Major and Other Course Credits		24			24

ADDITIONAL TRANSFER COURSE		Business Admin Program Requirements		ODU Course Equivalents	
Course #	Course Title	Credit			Credit
IT 119	Information Literacy and Research	3	I119 (TNCC)	IT 150G (Gen Ed Information Literacy)	3
ADDITIONAL TRANSFER COURSES					
MTH 164 <sup>2</sup>		3	M165 (TNCC)	ODU Course Equivalents	3

<sup>1</sup> AS Bus Admin requires HLT/PEd (1). NNAS Bus Admin program requires HLT 210 (2).  
<sup>2</sup> Not required by TNCC for the AS Bus Admin, but satisfied by NNAS Bus Admin program requirements.  
 Note: Completed Virginia community college ASBA satisfies all lower-level General Education requirements and results in a waiver for the Language and Culture requirement.

The lower division general education Language and Culture and the Introduction to Business (BUSN 110) requirements will be satisfied by completion of all courses outlined in this program agreement with the award of the AS in Business Administration from the VCCS.

Student must earn C or better for any course to transfer.

To participate in this articulation agreement please visit Old Dominion University's website to complete The Letter of Intent:  
<http://uc.odu.edu/advising/transfer/letterofintent.shtml>

Completion of this articulation agreement alone does not guarantee admission to Old Dominion University. All students must meet the requirements set by the Office of Admissions and the Guaranteed Admissions Agreement (GAA) with the Virginia Community College System. Please visit [admissions.odu.edu](http://admissions.odu.edu) for more information regarding guaranteed admission to Old Dominion University.

Additional Old Dominion University Requirements			
BNAL	306	Statistical Data Analysis and Management Science	3
ECON	301	Managerial Economics	3
FIN	323	Introductory Financial Management	3
OPMT	303	Operations Management	3
MGMT	340	Human Resources Management	3
FIN	331	Legal Environment of Business	3
IT	360T	Principles of Information Technology	3
MGMT	325	Contemporary Organizations and Management	3
MKTG	311	Marketing Principles and Problems	3
MGMT 300/400 Electives (4)			12
Free	300/400	Elective	3
MGMT	485W	Business Policy and Strategy (Writing Intensive)	3
MGMT	361	International Business Operations	3
MGMT	451	Organizational Behavior	3
PHIL	303E	Business Ethics	3
Upper Division General Education Option D		One 300 or 400 level elective outside the College of Business	3
<b>Total Credits to be Taken at ODU</b>			<b>57</b>
<b>Total Transfer Credits from Community College</b>			<b>67</b>
<b>Total Credits for Degree at ODU</b>			<b>124</b>

*James H. Hughes* 11-11-13  
 Signature Date

r. Jim Hughes  
 Manager, Trainer  
 Apprentice School

*Ali Ardalani* 9/18/13  
 Signature Date

ODU CBPA Associate Dean: Ali Ardalani

*Everett Jordan* 11-11-13  
 Signature Date

Everett Jordan  
 Director of Education  
 Apprentice School

*Brian Payne* 11/16/13  
 Signature Date

Dr. Brian Payne  
 Vice Provost, Academic Programs  
 Old Dominion University

Thomas Nelson Community College A.A.S. Technical Studies Specialization: Engineering Technology 718-04 2013-2014		The Apprentice School Technical Studies Program Requirements		Old Dominion University BS OTS - Industrial Technology	
TNCC GENERAL EDUCATION COURSES		NNAS Tech Studies Program Requirements		ODU Course Equivalents	
Course#	Course Title	Credit			Credit
ENG 111	College Composition I	3	E111 (TNCC)	ENGL 110C (Gen Ed Written Communication)	3
PHI 220	Ethics	3	P220 (TNCC)	PHI 230E (Gen Ed Philosophy)	3
--	Social Science Elective	3	ECD 201 (TNCC)	ECON 2015 (Gen Ed Human Behavior)	3
--	Social Science Elective	3	H121 (TNCC)	HIS 104H (Gen Ed Interpreting the Past)	3
MTH 115 or MTH 158	Technical Math or College Algebra	3	M111 (NNAS)		
HLT/PEP	Health or Physical Education Elective(s)	2	H210/HLT 210 (TNCC) or Apprentice School Athletics (NNAS) or Military		
SDV 100	College Success Skills	1	SDV 100 (TNCC)	HLTH 2ELE UNIV 100	2 1
Subtotal - General Education Course Credits in AAS degree		18		Subtotal - General Education Course Credits for Transfer	

MAJOR AND OTHER COURSES		Credit		Credit	
CAD 151	Engineering Drawing Fundamentals I	3	D111(NNAS) + 40 hrs CAD Training (NNAS)	MET 120 (Technical Content)	
ENG 115	Technical Writing	3	C237 (NNAS)	ENGL 231C (Gen Ed Written Communication)	
ETR 104 or ELE 150	Electronics Fundamentals w/ Computer Apps or A.C. and D.C.	3	E150 (TNCC) or X311+X3112(NNAS)	STEM 1ELE or STEM 241 (Technical Content)	
MTH 116 or MTH 164	Technical Math II or Precalculus II	3	M112 (NNAS)		
PHY 201	General College Physics I	4	P222 (NNAS) + P221 (NNAS) + P199 (TNCC)	PHYS 111H (Gen Ed Science)	
MEC 100 or MAR 120	Introduction to Ship Systems	3	N111 (NNAS) + N222 (NNAS)	STEM 1ELE (Technical Content)	
ITE 115 or CSC 200	Intro to Computer Apps & Concepts or Intro to Computer Science	3	C211(NNAS)		
ITE 140 or IND 181	Spreadsheet Software or World Class Manufacturing	3	I181 (TNCC)	CS 101 (Elective)	
IND 140 or BUS 209	Quality Control or Continuous Quality Improvement	3	B209 (TNCC)	STEM 1ELE (Technical Content)	
BUS 200 or BUS 117	Principles of Management or Leadership Development	3	B122+B112 (NNAS)	BUSN 2ELE (Business Elective)	
--	Elective	3	M113 (TNCC) or X313 (NNAS)	BUSN 2ELE (Business Elective)	
--	Elective	3	Apprenticeship Completion (NNAS)- OIT & Trades Experience	STEM 231 (Technical Content)	
--	Elective	3	Apprenticeship Completion (NNAS)- OIT & Trades Experience	STEM 367 (Technical Content)	
--	Elective	3	Apprenticeship Completion (NNAS)- OIT & Trades Experience	STEM 367 (Technical Content)	
ND 297	Cooperative Ed in Engineering Tech	3	Apprenticeship Completion (NNAS)- OIT & Trades Experience	STEM 367 (Technical Content)	
ND 297	Cooperative Ed in Engineering Tech	3	Apprenticeship Completion (NNAS)- OIT & Trades Experience	STEM 367 (Technical Content)	
Total Major and Other Course Credits		49		Total Major and Other Course Credits	46
Total Minimum Credits		67		NNAS Tech Studies Program Total Transfer Credits	61

**Required Lower Division General Education courses (not included in the AAS degree or NNAS Tech Studies Program )**

Thomas Nelson Community College	Old Dominion University	Credits
Public Speaking	COMM 101R	3
MTH 158	MATH 102M (departmental requirement)	3
MTH 146, 157, 240, 241, or 242	STAT 130M (departmental requirement)	3
ENG 125, 236, 237, 241, 242, 243, 244, 245, 246, 251, 252, 253, 254, 255, 256, 267, or 268	ENGL 112L, 114L or FLET 100K	3
ART 100, 111, or 112; CST 130, 141, 142, 151, 152, or 250	Human Creativity	3
ART 101, 102, 103, 104, 105, 106, 133, 150, 201, 202, HUM 100, 201, 202, 260, MUS 121 or 122 or 125, or CST 231 or 232, ART 113, 114		4
PHY 202	PHYS 112N	3
PSY 201	PSYC 2015 (prerequisite to PSYC 303 required in the major)	22
<b>Subtotal</b>	<b>Total General Education Course Credits for transfer</b>	<b>22</b>

**Required Lower Division course (not included in the AAS degree or NNAS Tech Studies Program )**

Thomas Nelson Community College	ODU Course Equivalents	Credit
ACC 211 Principles of Accounting I	ACCT 201 Principles of Accounting	3

**ADDITIONAL TECHNICAL ELECTIVES (if applicable)**

NNAS	ODU Course Equivalents	Credit
X311 Applied Theory I: DC Concepts	STEM 241 (Technical Content), STEM 1E1E (Technical Content)	6
X313 Applied Theory II: AC Concepts	STEM 1E1E (Technical Content)	3
X313 Applied Theory III: Polyphase Systems and Controls	STEM 1E1E (Technical Content)	3
X314A Electronics I	STEM 1E1E (Technical Content)	3
X314B Electronics II	STEM 1E1E (Technical Content)	3

The lower division general education Language and Culture requirement will be satisfied by completion of all courses outlined in this program agreement, including the additional lower division general education requirements.

Information Literacy and Research and Impact of Technology are met through the major.

\*Student must earn C or better for any course to transfer.

To participate in this articulation agreement, please visit Old Dominion University's website to complete The Letter of Intent: <http://uc.odu.edu/advising/transfer/letterofintent.shtml>

Completion of this articulation agreement alone does not guarantee admission to Old Dominion University. All students must meet the requirements set by the Office of Admissions. Please visit [admissions.odu.edu](http://admissions.odu.edu) for more information regarding admission to Old Dominion University.

\* The following courses may be completed with the VCCS, with C or better, to meet ODU degree requirements for this major. However, all students are required to complete a minimum of 30 credit hours with ODU and 12 of those must be at the 300/400 level in the major to earn the Bachelor of Science degree. These course substitutions will not be used to satisfy requirements in any other ODU degree programs (majors or minors) outside the SEPS/STEM Department:

Additional courses available at TNCC:

CCS ODU  
 US 111 substituted for SEPS 302  
 SY 126 substituted for PSYC 303  
 MS 100 substituted for HMSV 339  
 JS 150 or BUS 200 substituted for MGMT 325  
 JS 205 substituted for MGMT 340  
 KT 100 substituted for MKGT 311

**Additional Old Dominion University Requirements**

MKTG	311**	Marketing and Principles and Problems	3
MGMT	325**	Contemporary Organizations and Management	3
SEPS	302**	Workforce Supervision	3
HMSV	339**	Interpersonal Relations	3
MGMT	340**	Human Resources Management	3
STEM	370T	Technology and Society (Writing Intensive)	3
SEPS	400	Instructional System Development	3
PSYC	303**	Industrial/Organizational Psychology	3
Business Electives			9
Upper Division General Education			6
SEPS	402	Industrial Methods in Occupational Studies	3
<b>Total Credits to be Taken at ODU</b>			<b>42</b>
<b>Total Transfer Credits</b>			<b>86</b>
<b>Total Credits to be Taken at ODU</b>			<b>42</b>
<b>Total Credits for Degree at ODU</b>			<b>128</b>

**SUMMARY**

James H. Hughes 11-11-13  
 Signature Date

Jim Hughes  
 Manager, Trainer  
 Apprentice School

Doreen Watson 10/11/13  
 Signature Date

ODU Department Chair

Errett Jordan 11-11-13  
 Signature Date

Errett Jordan  
 Director of Education  
 Apprentice School

Brian Payne 10/16/13  
 Signature Date

Dr. Brian Payne  
 Vice Provost, Academic Programs  
 Old Dominion University