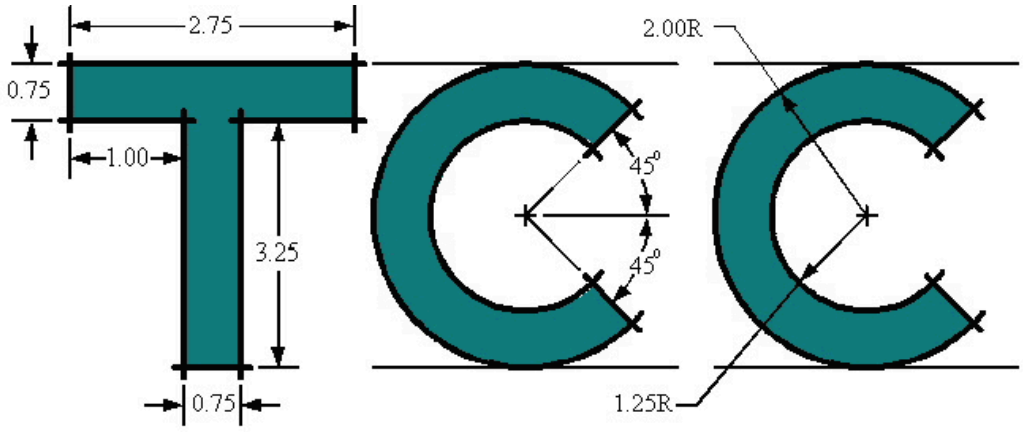


ENGINEERING

Student Handbook

for

ENGINEERING

at

Tidewater Community College
2021 – 2022

For the most recent updates to this handbook, see
www.tcc.edu/faculty/webpages/pgordy/handbook.pdf
Revised: 6-1-21

TABLE OF CONTENTS

Engineering at Tidewater Community College 3

Selecting an Engineering Discipline 4

Engineering Salaries 5

Engineering versus Engineering Technology 6

Engineering and Engineering Technology transfer relationship between TCC and ODU 7

TCC Engineering Curriculum Sheet 8-9

Approved Engineering Electives 9-12

Flowcharts of Technical Courses 13-14

Tentative Annual Schedule for Engineering 15

Scholarships 16

Internships 17

TCC Engineering Club 18

Calculator Requirements/ Computer Recommendation 19

Transfer Options for TCC Engineering Students in Virginia. 20

Old Dominion University (ODU) Transfer Information 21

- General Information for all ODU Engineering Curricula 21-22
- Transfer Information for ODU Electrical Engineering 23-24
- Transfer Information for ODU Computer Engineering 25-26
- Transfer Information for ODU Mechanical Engineering 27-28
- Transfer Information for ODU Civil Engineering 29-30

Virginia Tech Transfer Information 31-35

Virginia Commonwealth University Transfer Information 36-37

Engineering at TCC

The curriculum in Engineering at Tidewater Community College is designed for students who plan to transfer to a four-year college or university to complete a baccalaureate degree program in one of several fields of engineering such as:

- ***Aerospace Engineering***
- ***Biomedical Engineering***
- ***Civil Engineering***
- ***Chemical Engineering***
- ***Computer Engineering***
- ***Environmental Engineering***
- ***Electrical Engineering***
- ***Nuclear Engineering***
- ***Mechanical Engineering***
- ***Mining/Metallurgical Engineering***
- ***Petroleum Engineering***
- ***Industrial/Systems Engineering***

The curriculum is based on a core of material fundamental to all areas of engineering. This material includes courses which depend heavily on advanced mathematics and sciences applied to engineering fields. The courses offered during this two-year program are very comparable to the first two years of most four-year engineering programs; however, it is essential that students acquaint themselves with the requirements and the curricula of the college or university to which transfer is considered. By obtaining transfer information early, students can avoid later transfer problems such as:

1) Each engineering college may not have programs in all engineering fields. For example, if you wish to major in Chemical Engineering, your choices may be somewhat limited.
2) Certain engineering programs may require freshman and sophomore level courses that are not a part of TCC's Engineering curriculum. In many cases students can make some approved course substitutions in the A.S. degree program in order to transfer as efficiently as possible.
3) Some engineering departments at certain universities may require a higher GPA than others.

Transfer information has been provided in this booklet for ODU, Virginia Tech, and VCU since the majority of TCC Engineering students transfer to these universities. A table of transfer options for colleges in Virginia has also been included. TCC students may also wish to consult with the TCC Counseling Center in planning their programs and selecting electives.

What's new in the 2021-22 Engineering Handbook?

- EGR 120 (Introduction to Engineering) has been replaced by EGR 121 (Foundations of Engineering)
- EGR 110 (Engineering Graphics) has been replaced by EGR 122 (Engineering Design)
- The A.S. degree in Engineering has been changed to replace EGR 125 (4 cr) and CHM 112 (4 cr) with 8 additional credits of Approved EGR Electives to give students more transfer flexibility. Some students may still be advised to take EGR 125 and CHM 112 as Approved EGR Electives.
- EGR 206 (Engineering Economics) has been added as a possible Approved EGR Elective.

For additional information regarding the Engineering program at TCC, contact:

Paul Gordy, Associate Professor & Engineering Program Head, Virginia Beach Campus
Office: H-115 (ATC) Phone: 822-7175 Email: PGordy@tcc.edu
Paul Gordy's Home Page: http://faculty.tcc.edu/PGordy/
Kenny Grimes, Associate Professor – Engineering, Virginia Beach Campus
Office: H-118 (ATC) Phone: 822-7278 Email: KGrimes@tcc.edu
William Simmons – Assistant Professor Engineering, Chesapeake Campus
Office: Room 403-F (CT-2) Phone: 822-5259 Email: WSimmons@tcc.edu
Dr. Swati Chokshi – Professor Engineering, Virginia Beach Campus
Office: Room 101-A Phone: 822-5258 Email: SChokshi@tcc.edu

Selecting an Engineering Discipline

Many factors are involved in choosing an Engineering discipline in which to specialize. Some students have a definite area of preference before they begin their college education, while other students may have difficulty selecting a discipline. Since most Engineering programs are quite similar in the freshman year, students have some time in which to make this decision. Although the sophomore years of most Engineering programs are somewhat similar, there are often some discipline-specific courses required so it is to the students advantage to select a discipline or at least begin to narrow the choices. The junior year of any Engineering program will be almost completely discipline-specific, so all students should have selected an Engineering discipline by the end of their sophomore year. When students transfer from TCC into a four-year Engineering program they will need to apply for transfer into a specific Engineering department.

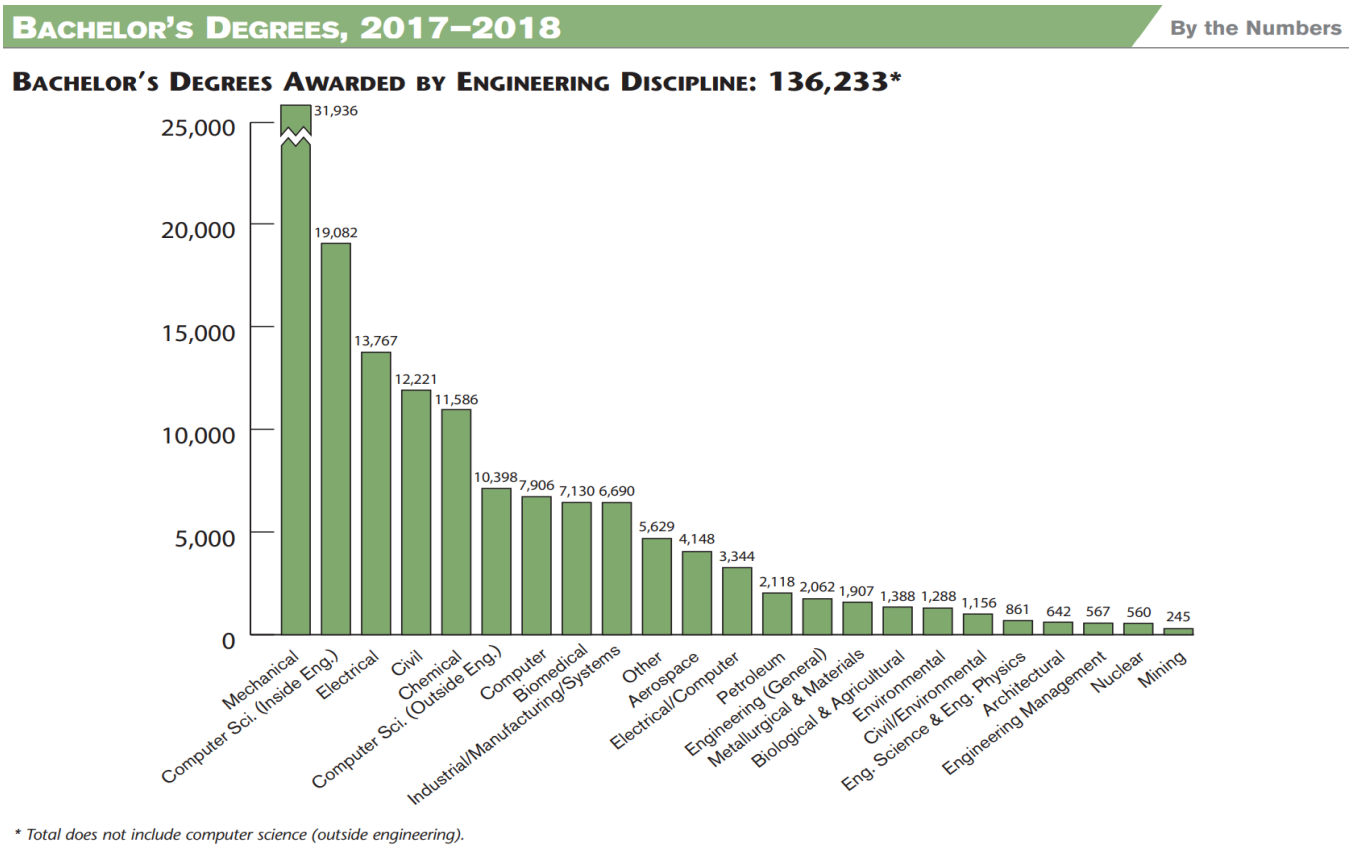
Some possible factors in selecting an Engineering discipline are listed below.

- Work experience in a related area
- Personal preference/strengths/aptitude
- Local employment opportunities
- Salary
- Nationwide demand for specific types of engineers
- Engineering disciplines available at local universities
- Work environment

Starting salaries for recent graduates with Bachelor's degrees in Engineering are consistently quite high. The tables on the following page shows average starting salaries for specific disciplines.

To a large extent, the law of supply and demand seems to control how many potential Engineers enter each discipline. If jobs were not available in a particular area of Engineering, the number of students entering that discipline would certainly begin to decrease. The chart below indicates how many BS degrees in Engineering were awarded by discipline in 2017-2018 (Source: Profiles of Engineering and Engineering Technology Colleges – ASEE 2019 Edition).

Bachelor's Degrees Awarded By Engineering Discipline in 2017-2018: 136,233



Engineering Salary by Discipline

Discipline	Starting Salaries *	Mid-Career Salary *
Aerospace (AE)	$69,644	$84,566
Biomedical (BI)	$61,920	$97,090
Chemical (CH)	$67,527	$117,090
Civil (CV)	$58,190	$94,360
Computer Engr. (CP)	$73,110	$123,030
Computer Science	$66,648	$81,472
Electrical (EE)	$66,925	$103,480
Environmental (EN)	$57,336	$94,220
Industrial (IN)	$61,695	$68,288
Materials (MT)	$67,303	$97,890
Mechanical (ME)	$63,055	$93,540
Nuclear (NU)	$69,257	$88,082
Petroleum (PT)	$87,134	$101,302

* PayScale.com, January 2021 ** US Dept. of Labor, Jan 2021

Engineering Salary by Length of Experience

Years Experience	Average Salary (for all engineers)
< 1	$55,500
1 - 2	$55,675
3 - 4	$65,000
5 - 9	$73,082
10 - 14	$84,131
15 - 19	$98,797
20 - 24	$112,000
25 or more	$121,000

Reference: NSPE 2013 Engineering Income and Salary Survey

According to the 2013 NSPE Engineering Income & Salary Survey:

- The average annual salary for an engineer with a BS degree is $84,380.
- The average annual salary for an engineer with a MS degree is $91,250.
- The average annual salary for an engineer with a PhD degree is $108,707.
- The average annual salary for a licensed Professional Engineers (PE) is $92,000 (the average increases up to $117,200 when combined with other licenses).

Engineering or Engineering Technology?

Students considering a major in Engineering should understand the difference between Engineering and Engineering Technology. Some colleges or universities, such as ODU, offer programs in both Engineering and Engineering Technology. Other colleges or universities, such as Virginia Tech, UVA, and VCU offer only Engineering programs. In 2016 ASEE provided data on:

- 296 colleges and universities offering BS degrees in Engineering
- 61 colleges offering BS degrees in Engineering Technology
- Not all colleges and universities participate in this survey, but it gives a good representation.

(Source: Profiles of Engineering and Engineering Technology Colleges – ASEE 2016 Edition).

In general, Engineering is a more rigorous program mathematically, providing a better foundation for design work, research, and post-graduate study (Master's or Ph.D. degrees). Engineering graduates are typically offered higher salaries and will have a wider assortment of employment opportunities than Engineering Technology graduates, although in some cases they may do the same work. Engineers typically have the lead role in engineering projects such as new product development, engineering design work or analysis, production management, consulting, etc., whereas Engineering Technologists often work in more of an engineering support capacity.

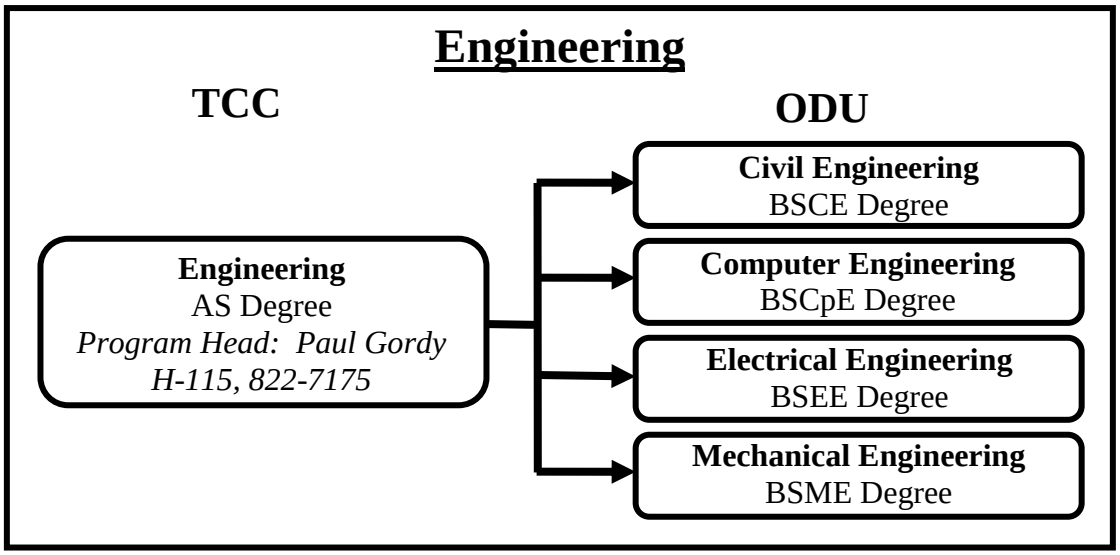
Engineering Technology is typically more "hands on" oriented and students in these curricula may spend much more time in lab courses than Engineering students. Engineering Technologists often work closely with Engineers, but in a supportive role such as in quality assurance, prototype model construction and testing, safety, reliability assessment, design modification, and production (although Engineers may work in these areas as well). Students majoring in Engineering Technology should realize that some companies will not hire graduates with Engineering Technology degrees (such as NASA) and hire only applicants with Engineering degrees for Engineering positions. Other companies make no distinction between the degrees. The federal government (Norfolk Naval Shipyard, NAVSEA, Naval Public Works, etc.) will often hire Engineering Technology graduates as engineers once they pass the Fundamentals of Engineering (FE) exam. Post-graduate programs in Engineering Technology are rare and Engineering Technology students are typically required to take many undergraduate math and engineering courses before they will be accepted into postgraduate Engineering programs.

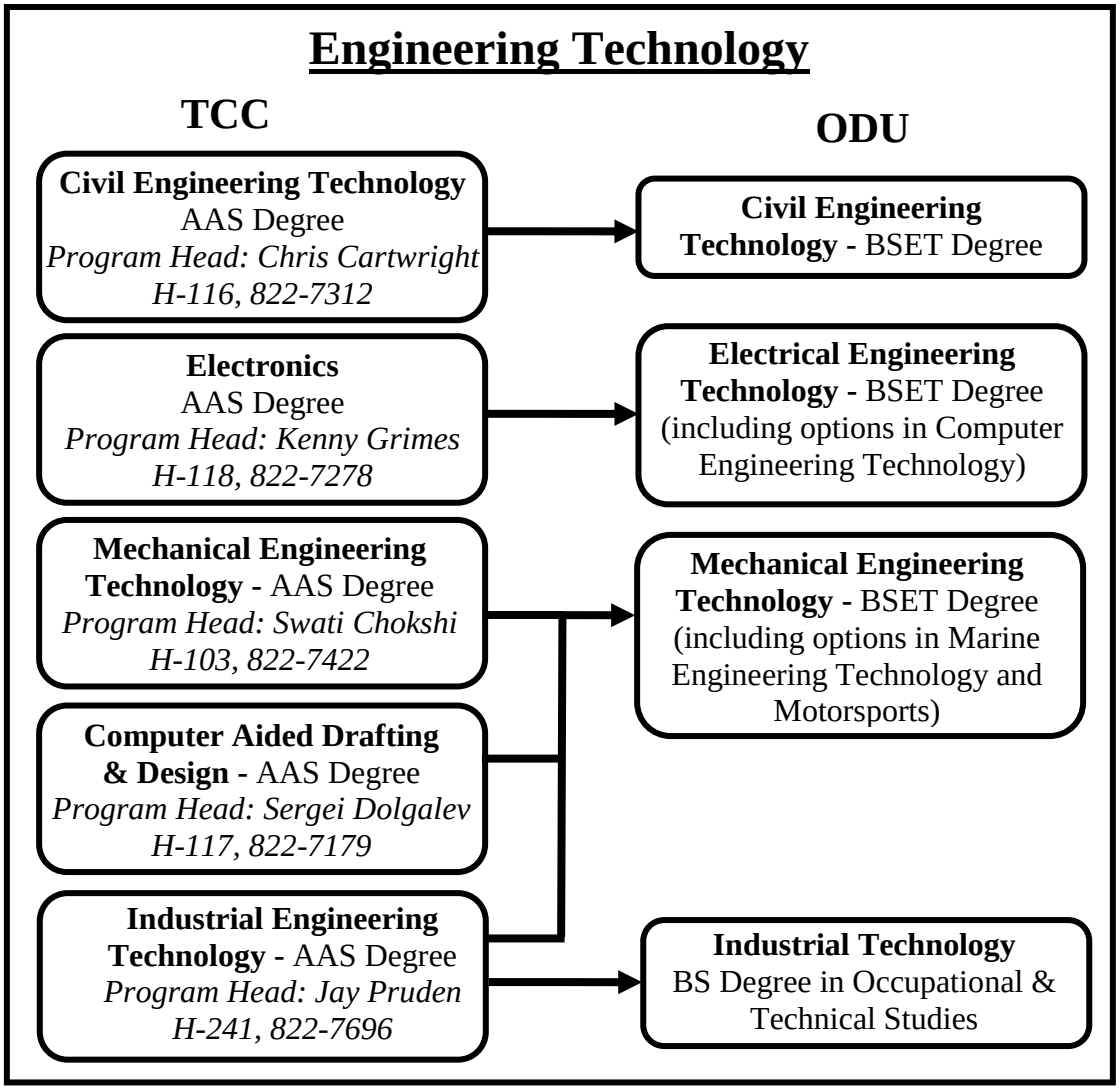
Students sometimes take courses in Engineering Technology programs and then wish to use the credits in an Engineering program. This is generally not possible. ABET accredits both Engineering and Engineering Technology programs nationwide and differences in content typically makes it unlikely for Engineering programs to give credit for Engineering Technology courses. However in the opposite situation, a student wishing to use credits from an Engineering program can transfer courses into an Engineering Technology program.

As stated previously, Virginia Tech and VCU offer only Engineering programs. ODU offers both Engineering programs (with 5 undergraduate degrees) and Engineering Technology programs (with 3 undergraduate degrees). The chart on the following page indicates how different programs at TCC transfer to ODU.

Engineering and Engineering Technology

Transfer Relationship between TCC and ODU





ENGINEERING (831)

Associate in Science Degree: Engineering (2021-22 Catalog)

Link to online TCC catalog: Tidewater Community College - Acalog ACMS™ (tcc.edu)

TIDEWATER COMMUNITY COLLEGE
From here, go anywhere.™

Official Curriculum Guide

Name: _____ Date Entered TCC: _____

SIS Empl ID: _____ Counselor: _____

Associate of Science: Engineering(831)

The Associate of Science (A.S.) degree program in Engineering is designed for students who plan to transfer to a four-year college or university to pursue a Bachelor of Science (B.S.) degree in engineering in one of several fields. The Engineering degree program includes general education and engineering courses, which cover theoretical concepts and practical applications. Graduates with the baccalaureate degree find careers in aerospace, computer, environmental, civil, electrical/electronics, mechanical, mining/metallurgical, and nuclear engineering.

Admission to the Engineering program requires satisfactory completion of the following high school units or their equivalents: four units of English; four units of mathematics (two units of algebra, one unit of plane geometry, one unit of advanced mathematics or trigonometry and solid geometry); one unit of laboratory science; and one unit of social studies.

Students desiring to enter the A.S. in Engineering program must provide proof of having a strong foundation in math and science and be eligible to take ENG 111. Additional information is available online at tcc.edu (search keyword "Engineering").

Engineering courses required for the Engineering degree are available at the Chesapeake and Virginia Beach campuses.

Semester 1

Classification Course No.	Course Title	Credits	Prerequisites	Co-Requisites	When Taken	Grade
⁺EGR 121	Foundations of Engineering	2	ENG 111 eligible; MTH 162 or MTH 167, or equivalent; or departmental approval.	None	_____	( )
CHM 111	General Chemistry I	4	Eligible to enroll in ENG 111 and MTH 161 or higher	None	_____	( )
ENG 111	College Composition I	3	EDE 10, ENF 1, ENF 2 or placement	None or EDE 11 with placement	_____	( )
*MTH 263	Calculus I	4	MTH 162, MTH 164, MTH 166, or MTH 167 with a grade of C or better; or placement	None	_____	( )
⁺SDV 101	Orientation to Engineering and Technologies	1	None	None	_____	( )
_____	Humanities Elective [1]	3			_____	( )
	Semester Total	**17**				

Semester 2

Classification Course No.	Course Title	Credits	Prerequisites	Co-Requisites	When Taken	Grade
PHY 241	University Physics I	4	MTH 263 or divisional	None	_____	( )

Semester 2

Classification Course No.	Course Title	Credits	Prerequisites	Co-Requisites	When Taken	Grade
	University Physics I		approval			
EGR 122	Engineering Design	3	EGR 121 (or EGR 120) or departmental permission	None	_____	( )
_____	Approved Engineering Elective [2] (CHM 112, EGR 125 or EGR 140)	4			_____	( )
ENG 112	College Composition II [4] (or ENG 131)	3	ENG 111 or equivalent and ability to use word processing software	None	_____	( )
MTH 264	Calculus II	4	MTH 173 or MTH 263 with a grade of C or better	None	_____	( )
	Semester Total	**18**				

Semester 3

Classification Course No.	Course Title	Credits	Prerequisites	Co-Requisites	When Taken	Grade
MTH 267	Differential Equations	3	MTH 264 or MTH 174 with a grade of C or better	None	_____	( )
PHY 242	University Physics II	4	PHY 241 and MTH 264, or divisional approval	None	_____	( )
_____	Approved Engineering Elective [2]	3			_____	( )
_____	Approved Engineering Elective [2]	3			_____	( )
_____	History Elective [3]	3	Eligible to enroll in ENG 111		_____	( )
	Semester Total	**16**				

Semester 4

Classification Course No.	Course Title	Credits	Prerequisites	Co-Requisites	When Taken	Grade
MTH 265	Calculus III	4	MTH 174 or MTH 264 with a grade of C or better	None	_____	( )
_____	Approved Engineering Elective [2]	3			_____	( )
_____	Approved Engineering Elective [2]	4			_____	( )
_____	Humanities Elective [1]	3			_____	( )
_____	Social Science Elective [1]	3			_____	( )
	Semester Total	**17**				

Total Minimum Credits 68

[1] *Eligible courses are listed under General Education Core Requirements. Students should consult with an academic advisor or counselor to choose the appropriate course(s).*

[2] *Recommended courses for approved engineering electives:*

Old Dominion University: Civil
EGR 140 (3); EGR 245 (3); EGR 246 (3); CHM 112 (4); (BIO 101 (4) or GOL 105 (4))
..... Total (17)

Old Dominion University: Computer
EGR 125 (4); EGR 262 (2); EGR 270 (4); EGR 271 (3); EGR 272 (3); CSC 210 (4); CHM 112 (4)
..... Total (24)

Old Dominion University: Electrical
EGR 125 (4); EGR 262 (2); EGR 270 (4); EGR 271 (3); EGR 272 (3); CHM 112 (4)
..... *Total (20)*

Old Dominion University: Mechanical
EGR 125 (4); EGR 140 (3); EGR 245 (3); EGR 246 (3); EGR 247 (1); MTH 283 (3)
..... *Total (17)*

Virginia Tech: Civil
EGR 140 (3); EGR 245 (3); EGR 246 (3); EGR 206 (3); MTH 266 (3)
..... *Total (15)*

Virginia Tech: Computer or Electrical
(EGR 125 (4) and EGR 262 (2) and EGR 270 (4) and EGR 271 (3) and EGR 272 (3)); MTH 266 (3)
..... *Total (19)*

Virginia Tech: Mechanical
EGR 140 (3); EGR 245 (3); EGR 246 (3); MTH 266 (3)
..... *Total (12)*

Virginia Tech: Chemical
CHM 112 (4); CHM 241(3); CHM 242(3); CHM 245(2); CHM 246(2); MTH 266 (3)
..... *Total (17)*

Virginia Commonwealth University: Chemical and Life Sciences
CHM 112 (4); CHM 241(3); CHM 242(3); CHM 245(2); CHM 246(2); EGR 206 (3)
..... *Total (17)*

Virginia Commonwealth University: Computer or Electrical
EGR 125 (4); EGR 262 (2); EGR 270 (4); EGR 271 (3); EGR 272 (3); EGR 206 (3)
..... *Total (19)*

Virginia Commonwealth University: Mechanical
EGR 125 (4); EGR 140 (3); EGR 245 (3); EGR 246 (3); EGR 247 (1);EGR 206 (3); (EGR 271 (3) and EGR 262 (2)); EGR 206 (3)
..... *Total (25)*

Virginia Commonwealth University: Computer Science
CHM 112 (4); EGR 125 (4); EGR 206 (3); CSC 205 (3); CSC 210 (4); BIO 101 (4); BIO 102 (4)
..... *Total (26)*

For engineering program requirements at other universities see EGR program head.

[3] *Students may select any of the following courses to meet this requirement: HIS 101, 102, 111, 112, 121, or 122.*

[4] *Students who plan to transfer to Old Dominion University are advised to take ENG 131 in place of ENG 112.*

Course Classification Legend

☆ Critical Course – A course faculty have identified as one that students should complete successfully, with a high level of understanding and comprehension, to progress in the program.

✴ Experiential Learning – A course where students can expect hands-on experiences and/or practical exposure opportunities which could be in or out of the classroom.

✦ Gateway Course – A course that serves as an introduction to the program and is typically offered early in the program.

❖ Milestone Course - Key intervals of program completion, if applicable.

Notes related to the A.S. degree in Engineering shown on the previous page

*__Approved Engineering Electives__ include the following courses (consult the Engineering Program Head for assistance in determining which courses are recommended for transfer into Civil Engineering, Mechanical Engineering, Electrical Engineering, etc.). A minimum of 17 credits of Approved Engineering Elective are required for the degree; however, additional courses may still be transferable.

EGR 140 - Engineering Mechanics - Statics (3 cr, co-requisite MTH 264, pre-requisite EGR 121/120)
EGR 206 – Engineering Economics (3 cr, pre-requisites EGR 121/120 and MTH 162/167)
EGR 245 - Engineering Mechanics - Dynamics (3 cr, pre-requisite EGR 140, MTH 264, PHY 241)
EGR 246 - Mechanics of Materials (3 cr, pre-requisite EGR 140)
EGR 247 - Mechanics of Materials Lab (1 cr, co-requisite EGR 246)
EGR 262 - Fundamental Circuits Lab (2 cr, pre-requisites EGR 271 and EGR 125)
EGR 270 - Fundamentals of Computer Engineering (4 cr, pre-requisite EGR 125, co-requisite of EGR 271)
EGR 271 - Circuit Theory I (3 cr, pre-requisite MTH 264, co-requisites MTH 267 and EGR 122/110)
EGR 272 – Circuit Theory II (3 cr, pre-requisites EGR 271 and MTH 267)
Additional Approved Engineering Electives include: CHM 112, 241, 242, 245, 246; BIO 101, 102; GOL 105; CSC 205, 210; MTH 266, 283;

** **Social Science/Humanities Electives.**

Eligible courses are listed in the 2021-2022 catalog:
General Education Core Requirements - Tidewater Community College - Acalog ACMS™ (tcc.edu)
Students should consult an academic advisor or counselor or the Engineering Program Head to choose the appropriate course(s). A table of general areas for each elective is provided below.

Social Science Electives ****	**Humanities Electives**
ECO 120, 201, 202	Art (history or appreciation only): ART 101,102,201, 202
GEO 210, 220	American Sign Language: ASL 125
HIS 101, 102, 111, 112, 121, 122	Drama/Theater: CST 141,151,152
PSY 116, 200, 215, 216, 230, 231, 232, 235	Foreign Languages (maximum of one): ASL 101, 102, 201, 202; CST 126; FRE 101,102, 203, 204; GER 101, 102, 201, 202; RUS 101, 102, 201, 202; SPA 101, 102, 203, 204
PLS 135, 136, 241	HUM 201, 202, 256, 259, 260
SOC 200, 211, 215, 268	Literature: ENG 125, 211, 212, 241, 242, 243, 244,251,252,253,254
SSC 210 (Women's Studies)	Music (history or appreciation only): MUS 121, 122, 221, 222
	Philosophy – PHI 101, 102, 111, 220
	Religion – REL 200, 210, 230

** Some Virginia Tech majors require ECO 202 (see note on page 35).

Other notes:

- ENG 112 is recommended for students transferring to Virginia Tech and most universities. ENG 131 is recommended for students transferring to ODU, although ENG 112 is acceptable.
- Virginia Tech no longer requires CHM 112 for any engineering majors except chemical engineering.
- ODU's Mechanical Engineering program no longer requires CHM 112 (all other engineering programs at ODU still require CHM 112).

New MTH Numbers: MTH numbers changed in Fall 2018 for all community colleges in the VCCS as follows:

Old number	New Number	Course Name
MTH 163 (3 cr)	MTH 161 (3 cr)	PreCalculus I
MTH 164 (3 cr)	MTH 162 (3 cr)	PreCalculus II
MTH 166 (5 cr)	MTH 167 (5 cr)	PreCalculus with trigonometry
MTH 173 (5 cr)	MTH 263 (4 cr)	Calculus I
MTH 174 (4 cr)	MTH 264 (4 cr)	Calculus II
MTH 277 (4 cr)	MTH 265 (4 cr)	Calculus III
MTH 279 (4 cr)	MTH 267 (3 cr)	Differential Equations
MTH 243 (3 cr)	MTH 283 (3 cr)	Probability and Statistics
MTH 285 (3 cr)	MTH 266 (3 cr)	Linear Algebra

Approved Engineering Electives

The TCC Engineering curriculum sheet on pages 8-10 includes 17 credits of "Approved Engineering Electives". Students should select a **minimum** of 17 credits of Engineering courses in order to satisfy this requirement. Factors to consider when selecting Approved Engineering Electives:

- Pick courses that will allow for efficient transfer into the Engineering program of your choice (see p. 20).
- Taking more than 17 credits of Approved Engineering Electives can be beneficial if they all transfer.

Recommended Approved Engineering Electives (minimum of 17 required)

ODU Civil Engineering		ODU Mechanical Engineering		ODU Electrical Engineering		ODU Computer Engineering *	
Electives	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**
CHM 112	4	MTH 283	3	CHM 112	4	CHM 112	4
GOL 105 or BIO 101	4	EGR 125	4	EGR 125	4	EGR 125	4
EGR 140	3	EGR 140	3	EGR 271	3	EGR 271	3
EGR 245	3	EGR 245	3	EGR 272	3	EGR 272	3
EGR 246	3	EGR 246	3	EGR 262	2	EGR 262	2
		EGR 247	1	EGR 270	4	EGR 270	4
						CSC 210	4

***** MTH 265 – Calculus III is not required for Computer Engineering at ODU, so 4 credits of Approved Engineering Electives can be used in place of MTH 265. See the Engineering Program Head to make this substitution.

VA Tech Chemical Engineering		VA Tech Civil Engineering		VA Tech Mechanical Engineering		VA Tech Electrical/Computer Engineering		VA Tech Computer Science	
Electives	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**
MTH 266	3	MTH 266	3	MTH 266	3	EGR 125 *	4	MTH 266	3
CHM 112	4	EGR 140	3	EGR 140	3	EGR 262 *	3	EGR 125	4
CHM 241	3	EGR 245	3	EGR 245	3	EGR 271 *	3	CSC 205	3
CHM 245	2	EGR 246	3	EGR 246	3	EGR 272 *	3	CSC 210	4
CHM 242	3	EGR 206	3	EGR ? **	5	EGR 270 *	4	CSC 215	3
CHM 246	2	EGR ?***	2			MTH 266	3	ITP 120	4
						MTH 288	3	MTH 288	3

* Take all 5 of these course as they transfer as a block to Virginia Tech

** EGR 125 (4 cr) and EGR 247 (1 cr) would be good choices, although they do not transfer into ME at VT. Any 5 credits of technical electives can be used.

*** GOL 105 (4) would be a good choice, but it does not transfer into CE at VT. Any 2 credits of technical electives can be used.

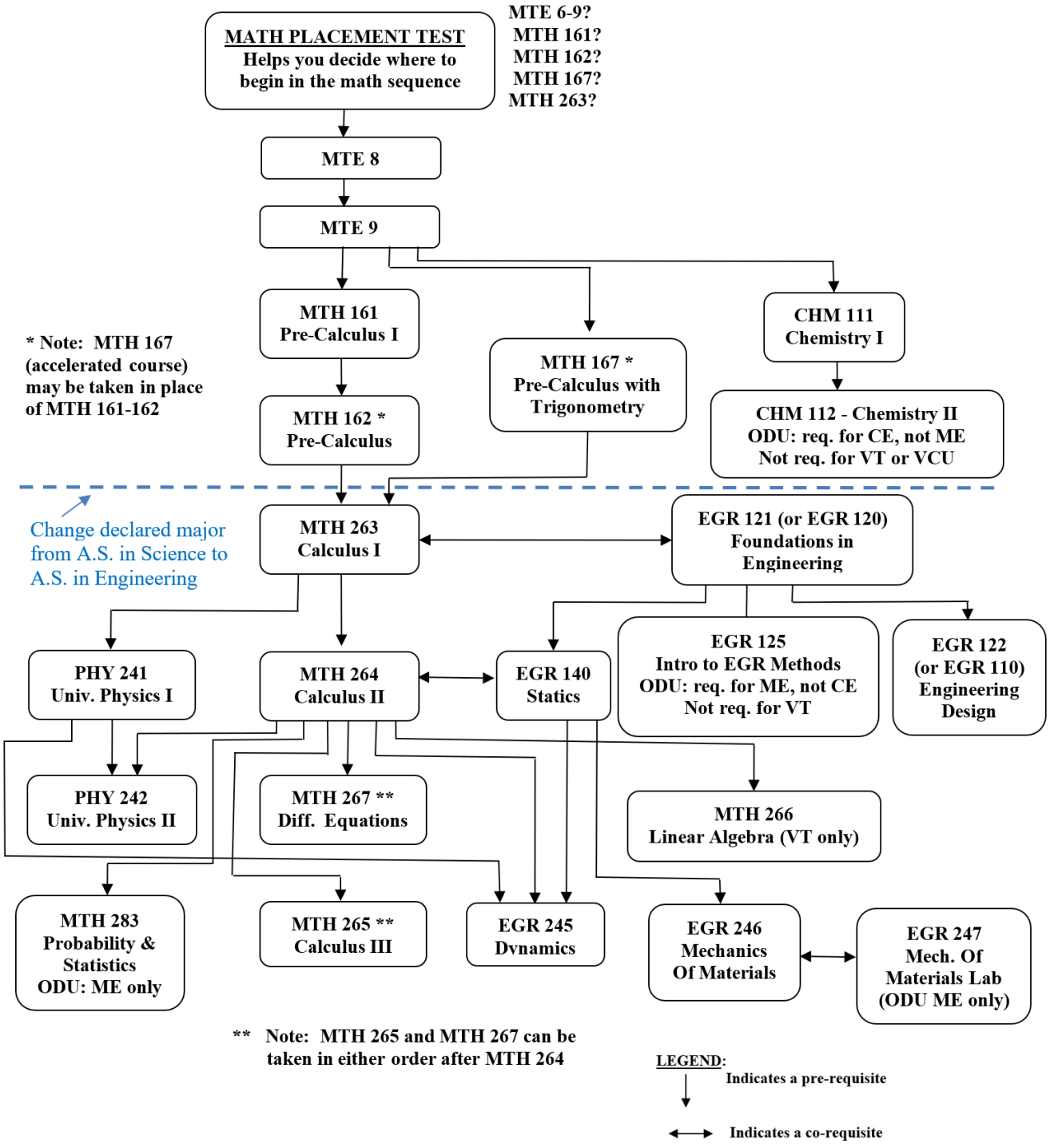
Note: For other VT majors: https://www.tranguide.registrar.vt.edu/2020/recbymajor.html

VCU Chem. & Life Sciences Engr.		VCU Biomedical Engineering		VCU Mechanical Engineering		VCU Electrical/Computer Engineering		VCU Computer Science	
Electives	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**	**Electives**	**Cr**
CHM 112	4	CHM 112	4	CHM 112	4	CHM 112	4	CHM 112	4
EGR 125	4	EGR 125	4	EGR 125	4	EGR 125	4	EGR 125	4
CHM 241	3	BIO 102	4	EGR 140	3	EGR 271	3	CSC 201	4
CHM 245	2	EGR 140	3	EGR 245	3	EGR 272	3	CSC 205	3
CHM 242	3	EGR 245	3	EGR 246	3	EGR 270	4	CSC ?***	2
CHM 246	2	EGR 271	3	EGR247	1	EGR262	2		

***ITP 120 (4 cr) or ITP 171 (4 cr) or CSC 210 (4) or CSC 215 (3) would be good choices, although they do not transfer into CS at VCU. Any 2 credits of technical electives can be used.

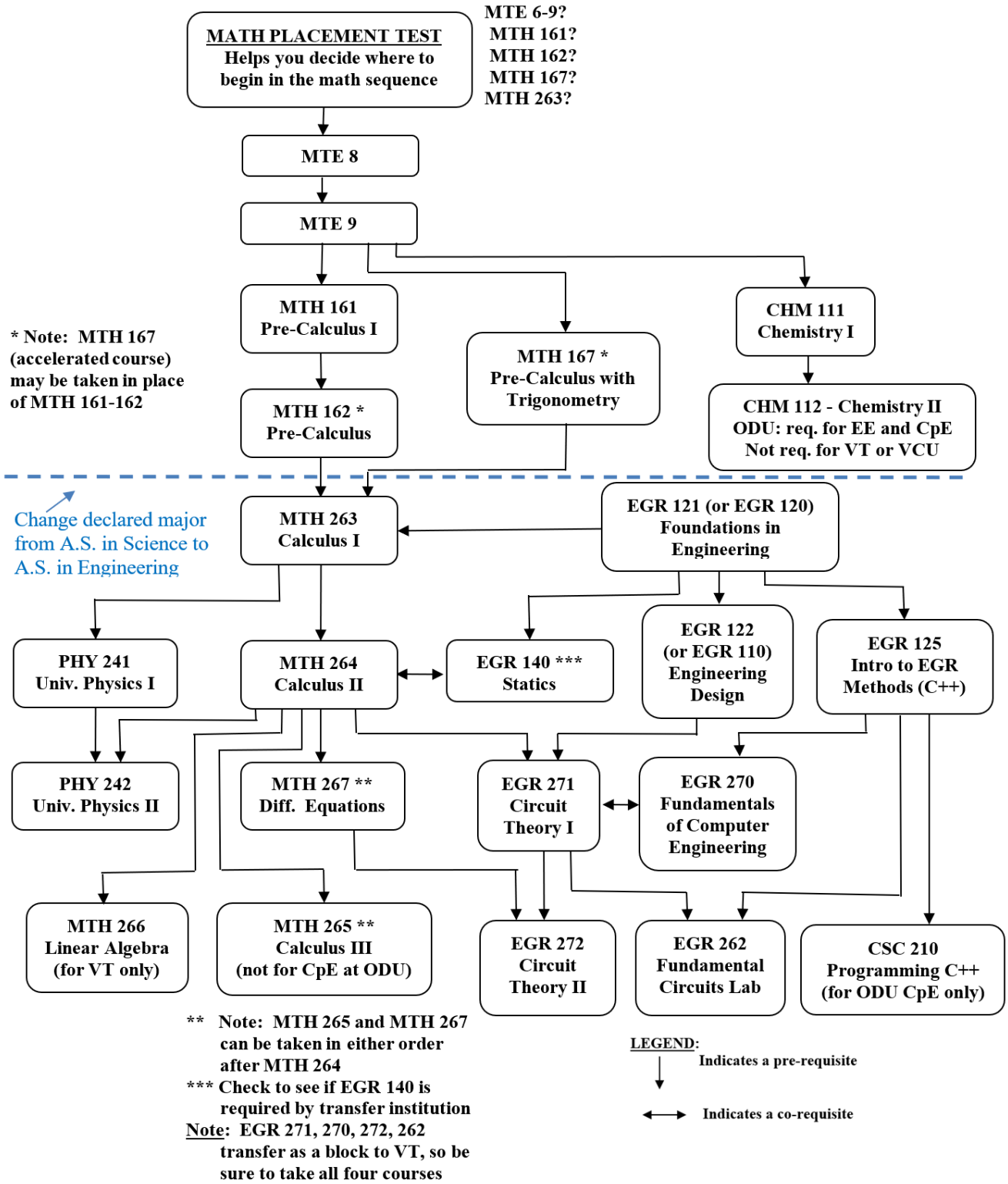
Flowchart of Technical Courses for
Engineering Students Transferring into

Civil or Mechanical Engineering



Flowchart of Technical Courses for
Engineering Students Transferring into

Electrical or Computer Engineering



Tentative Annual Schedule of Engineering Courses

Course	Fall		Spring		Summer	
	Va Beach Campus	Ches * Campus	Va Beach Campus	Ches * Campus	Va Beach Campus	Ches * Campus
EGR 121 – Foundations in Engineering	D/E	D/E	D/E	D/E	D/E	D/E
EGR 122 – Engineering Design	D/E/H	D/E	D/E	D/E	D/E	D/E
EGR 125 - Introduction to Engineering Methods (C++)	D/E	D/E	D/E	D/E	D/E	D
EGR 140 - Engineering Mechanics – Statics	D/E	D/E	D/E	D/E	D/E	E
EGR 206 – Engineering Economics				D		
EGR 245 - Engineering Mechanics – Dynamics	D/E	D	D/E	D	E	
EGR 246 - Mechanics of Materials	E	D/E	D	D/E		E
EGR 247 - Mechanics of Materials Laboratory	D	D	D	D/E		E
EGR 271 - Circuit Theory I	E	D	D	E	D	E
EGR 272 - Circuit Theory II	D	E	E	D		
EGR 262 - Fundamental Circuits Lab	D	E	D	E	E	
EGR 270 - Fundamentals of Computer Engineering	E	E	D	E	E	
MTH 266 – Linear Algebra			E		E	
MTH 283 – Probability and Statistics			E			

Key:

D - denotes a daytime class meeting between 8:00 - 4:00 p.m.
E - denotes an evening class meeting between 4:00 - 9:55 p.m.
H - denotes hybrid class (mostly internet-based class with some required meetings on campus)
* - typically also offered each semester at either the Chesapeake Campus or the Tri-Cities Center

Tri-Cities Center: Most EGR courses offered at Tri-Cities are at the request of Newport News Shipbuilding. As a result, it is difficult to predict which courses will be offered on a given semester. However, the following courses will be offered occasionally: EGR 121/120, 122/110, 120, 125, 140, 245, 246, 247, 262, 270, 271, and 272. The courses will be typically offered only during the day on Tuesdays and Thursdays. Contact William Simmons at WSimmons@tcc.edu for more information.

Scholarships

The following scholarships are available for engineering students. See the Engineering Program Head for additional information.

Name of Scholarship	General Information and Requirements	Amount	Deadline
Transfer Grant	Program in Virginia law to award grants to VCCS students completing Associate's degrees and transferring to 4-year Virginia colleges and universities. Find more details at: https://www.vawizard.org/wizard/transferGrant	$2000 annually for up to 3 years	Upon application to 4-year college
TCC STEM Promise Program	STEM Promise Program - designed to boost the number of degrees in science, technology and engineering awarded to women and minority students. 20 scholarships/year https://www.tcc.edu/paying-for-college/scholarships/stem-promise/	Pays tuition and fees for 2 years	Apply from November to March each year
Michael J. French, Jr. Memorial Engineering Scholarship	Established in 2005 by the TCC Engineering Club in honor of Michael J. French, Jr., an outstanding student who passed away in 2004. The scholarship is intended to support excellent students in pursuing careers in engineering through TCC's Engineering program. For more information: https://tcc.academicworks.com/opportunities/ Minimum GPA 3.0 Must have completed MTH 263 and EGR 121/120 or equiv.	$1500	Apr 1 – Jun 1 (Fall) or Oct 1 – Dec 1 (Spring)
Virginia Community College STEM Scholarship	This scholarship is given to encourage talented Virginia Community College students to pursue studines in technical fields, engineering, and the sciences. Awards are generally made for full-time students although part time students are also eligible. Only available us US citizens. Minimum GPA 3.0 For more information: http://vsgc.odu.edu/communitycollegescholarships/	$2000	March 15
Stihl Scholarship	Established by STIHL, Inc. to further strengthen their partnership with Tidewater Community college through the advancement of student development in the fields of advanced manufacturing, including Mechtronics, Engineering Technology, and/or Engineering. For more information: https://tcc.academicworks.com/opportunities/	$5000	Apr 1 – Jun 1 (Fall) or Oct 1 – Dec 1 (Spring)
Society for Women Engineers Scholarship	The Hamton Roads Section of SWE awards scholarships for women enrolled in engineering transfer programs. For more information: Scholarship - Hampton Roads (swe.org)	$1000	June 1
Leo Padis Scholarship	This scholarship is available only for students transferring to Virginia Tech and completing the A.S. degree in Engineering from a Virginia Community College. Merit based. Several scholarships awarded annually. https://eng.vt.edu/admissions/undergraduate-admissions-information/scholarships-for-prospective-students.html	$1000	June 1
Departmental Scholarships	Transfer scholarships are sometimes offered by specific ODU departments. Contact each department for additional information.	varies	when transferring

(continued)

SMART	Department of Defense, Science Math and Resarch for Transformation scholarship. Minimum 3.0 GPA, US, Canada, Australia, New Zealand, or United Kingdom citizenship. Summer internships, stipends, health insurance. DoD - SMART Scholarship	All education related expenses	December
Other Scholarships	Scholarships are often available through engineering societies, military-related organizations, credit unions, and other organizations.	varies	varies

Internships

Many engineering companies hire students while they are in college through internships or cooperative education. Students earn significant salaries as they work either part-time or full-time (on alternating semesters) or during the summer. Internships give students valuable experience to put on their resumes and often lead to offers of full-time employment upon graduation.

Name of Internship	**General Information and Requirements**
Virginia Commonwealth STEM Industry Internship Program (CSIIP)	With the support of the Commonwealth of Virginia, the Virginia Space Grant Consortium (VPGS) has created the Commonwealth Industry Internship Program (CSIIP) to help link STEM students to paid internships throughout Virginia. http://csiip.spacegrant.org/
STEM Takes Flight	Student opportunities include: paid onsite research experiences at NASA Langley and NASA Wallops. http://vsgc.odu.edu/stemtakesflight/
NAVSEA (Norfolk Naval Shipyard)	Naval Sea Systems Command (includes Norfolk Naval Shipyard and other facilities) Internship Program http://www.navsea.navy.mil/Home/Warfare-Centers/Career-Opportunities/Internships/
Dominion Energy	Dominion Energy – Scholarships, Interships, Cooperative Education https://careers.dominionenergy.com/go/Student-Employment/3372900/
NASA Langley	NASA has several programs, including LARSS (Langley Aerospace Research Summer Scholars) NASA - Langley Aerospace Research Summer Scholars Project
Jefferson Lab	https://www.jlab.org/div_dept/admin/HR/jobline/student.html
TCC Career and Employment Services	Job listings, job fairs, employment workshops, and more. Stop by B-112 or visit https://www.tcc.edu/student-services/career-services-center
USAJobs	The Federal Government has taken steps to help students and recent graduates join the Federal service. New opportunities will appear on USAJOBS as agencies post them. https://www.usajobs.gov/studentsandgrads
Naval Surface Warfare Center – Dahlgren	Ten-week NREIP internship program. Must have completed 31 credits by the time of the internship. Must be a US citizen. King George, VA and Virginia Beach, VA http://nreip.asee.org/apply
Other internships	Consider contacting local engineering companies for internship opportunities, TCC engineering instructors, and TCC's Career Services Center

TCC has student clubs at two campuses related to engineering:

- **TCC Engineering Club** – Virginia Beach Campus (Advisor: Paul Gordy, pgordy@tcc.edu)
- **STEM Club** – Chesapeake Campus (Advisor: Bill Simmons, wsimmons@tcc.edu)

The TCC Engineering Club and the STEM Club are very active student clubs that can greatly enhance the educational experience for Engineering students. Club activities include:

- Field Trips to local business/industry/colleges
- Engineering speakers from business/industry
- Presentations by 4-year Engineering colleges
- National ASEE robotics competition
- Social activities
- Regular meetings
- Design contests
- Service projects

These clubs also offers students leadership opportunity. Club officers and committee members are involved in planning field trips, speakers, contests, and more.

Virginia Beach Campus: Meetings are generally scheduled on Tuesdays and/or Thursdays from 12:30 to 1:30, but check with the club advisor or engineering instructors for more information. The club meets in room H-179 (Advanced Technology Center) during the Fall and Spring semesters. Join the ***TCC Engineering Club's Blackboard site*** to receive emails about upcoming club activities and to get access to club projects, job postings, scholarship information, photos from club events, etc. To join the club Blackboard site, send an email (***from your TCC email account***) to any club officer or to Paul Gordy, Engineering Club Advisor, at PGordy@tcc.edu .
Chesapeake Campus: Contact Bill Simmons (WSimmons@tcc.edu) for more information.

Surry Nuclear Power Plant field trip

Rosemont Road Cleanup Project

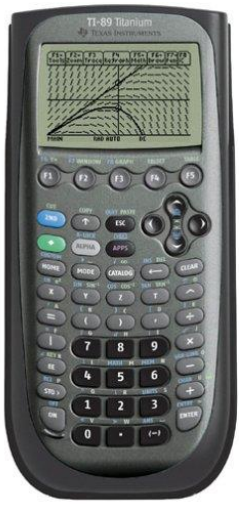
Field trip to Virgina Tech

ASEE Model Design (robotics) Competition

Calculator Recomendation for Engineering Students

It is recommended that Engineering students purchase one of the following calculators:

TI-89
Titanium



HP Prime
Graphing Calculator

TI-nspire CX CAS
(be sure that it is the CAS model)

Note:
- The TI-nspire CX CAS is similar to the TI-89
- The TI-nspire CX (not a recommended choice) is similar to the TI-84 and does include many powerful features in the CAS model.

Instructors will not actually check to see what type of calculator that the students are using. However, students should realize that they may be at a disadvantage to other students on a test if they have a calculator with lesser capabilities. Some of the features which separate these calculators from others are listed below:

- Solution of simultaneous equations (including complex coefficients)
- Vector operations (such as dot and cross products)
- Determination of roots of polynomials
- Algebraic operations involving complex numbers
- Unit conversions
- Symbolic calculations
- Integration and differentiation
- Programming capabilities
- Graphing

Computer Recommendation for Engineering Students

TCC Engineering students are not required to own computers. Computer labs are available in various locations on campus for student use:

- H-151, H-160, H-164 and H-208 in the ATC , and second floor of JUL on the VB Campus
- Room 409 (on a limited basis) and in the LRC at the Chesapeake Campus
- Rooms 1105 and 1109 at the Tri-Cities Center
- 5th floor of Martin Bldg, Norfolk Campus

Nearly all Engineering courses require significant computer use, so it is advantageous to have your own computer. Check with Engineering faculty for further recommendations.

Transfer Options for TCC Engineering Students in Virginia

TCC is accredited by the Southern Association of Colleges and Schools (SACS). TCC students can easily transfer credits to other colleges nationwide. Listed below are Engineering programs in Virginia which students may want to consider for continuing their Engineering education. Each college or university sets their own transfer requirements, so students should contact the college of their choice early in their program to check on transfer details. Detailed engineering transfer information for Old Dominion University and Virginia Tech is also provided later in this booklet.

College or University	Engineering programs offered	Comments
Old Dominion University	Civil Engineering Computer Engineering Electrical Engineering Mechanical Engineering Modeling & Simulation Engineering	• Guaranteed acceptance with 2.5 GPA • Foreign Language requirement waived • General Education requirements met by AS degree in Engineering. • More information later in this handbook
Virginia Tech	Aerospace Engineering, Biological Systems Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Computer Science (within Engineering), Electrical Engineering, Engineering Science & Mechanics, Industrial & Systems Engineering, Material Science Engineering, Mechanical Engineering, Mining & Minerals Engineering, Ocean Engineering	• VCCS Guaranteed Admission Agreement (GAA) with 3.2 GPA and completion of A.S. degree in Engineering (EGR). • GAA is available online at: https://www.tcc.edu/academics/degrees/transfer/transfer-agreements • General Education requirements (University Core Curriculum 1-7) automatically met by AS degree in EGR. • More information later in this handbook
Christopher Newport Univ.	Computer Engineering	3.0 GPA
Hampton University	Chemical Engineering Computer Engineering Electrical Engineering	Private University so more expensive Only Chemical Engineering program in the Tidewater area
George Mason University	Applied Computer Science BioEngineering Civil & Infrastructure Engineering Computer Engineering Computer Science Cyber Security Engineering Electrical Engineering Information Technology Mechanical Engineering Systems Engineering	2.85 GPA required for transfer See VCCS transfer guide at: https://admissions.gmu.edu/transferGuide/ VCCS General Articulation Agreement - https://www2.gmu.edu/admissions-aid/how-apply/transfer/virginia-guaranteed-admission-agreements
Norfolk State University	Electrical & Electronics Engineering Optical Engineering Mechanical Engineering (coming soon?)	2.0 GPA (3.0 GPA for combined BS/MS program)
Virginia Commonwealth University	Biomedical Engineering Chemical and Life Science Engineering Computer Engineering Computer Science (within Engineering) Electrical Engineering Mechanical & Nuclear Engineering	3.0 GPA VCCS Guarenteed Admission Agreement – GAA_Engineering_VCCS.pdf (vcu.edu)
University of Virginia	Aerospace Engineering, Biomedical Engineering, Chemical Engineering, Civil Engineering, Computer Science, Computer Engineering, Electrical Engineering, Engineering Science, Mechanical Engineering, Systems Engineering	Guaranteed admission to all engineering programs with 3.4 GPA and completion of A.S. degree. VCCS General Articulation Agreement - Guaranteed Transfer Admission | The Office of Undergraduate Admission (virginia.edu)
James Madison University	General Engineering	3.0 GPA, VCCS Gen. Articulation Agreement - http://www.jmu.edu/transfer/VCCStransfer/GAA.shtml
Virginia State University	Computer Engineering Manufacturing Engineering Computer Science (within Engineering)	Minimum 2.0 GPA for transfer
Virginia Military Institute	Civil & Environmental Engineering Electrical Engineering Mechanical Engineering	Minimum 3.2 GPA for transfer Must be 22 years old or younger

Old Dominion University Transfer Information

Admission:

Students should apply online at: www.odu.edu
The deadlines for transfer admission are as follows:

Fall or Summer admission: March 15 recommended, but check www.odu.edu
Spring admission: October 1

Students must indicate on their application which degree program they wish to pursue. Students who complete their A.S. degree in Engineering from TCC with a minimum GPA of 2.5 are automatically accepted into the Engineering department of their choice. Transfer credit will only be given for courses in which the student received a grade of C or better. Official copies of TCC transcripts must be sent at the time of application and again once all coursework at TCC has been completed. Engineering department personnel generally will not counsel students or provide specific transfer information until the student has applied for admission to ODU.

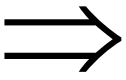
Notes:

1) Many TCC students transfer to ODU ***before*** completing their A.S. degree (often taking courses at both colleges in the same semester). If this occurs, simply let your ODU advisor know that you plan to complete the A.S. degree and your records will be evaluated such that you will receive the benefits of completing the degree.
2) Once you have been accepted, contact the departmental advisor for an appointment. Do not wait until the Preview session for transfer students. It is important to register as soon as possible in order to get into the engineering classes that you need.

General Information for all Engineering Programs at ODU:

1. ODU offers four engineering degree programs (also shown in the chart on page 7):
   Electrical Engineering **Civil Engineering**
   Computer Engineering **Mechanical Engineering**
2. There are at least ***three significant advantages*** to completing the A.S. degree in Engineering at TCC before transferring to ODU:
   A) The foreign language requirement is waived ***if the student completes*** the A.S. degree in Engineering from TCC.
   B) Scholarships are sometimes available for transfer students ***if the student completes*** the A.S. degree in Engineering. This includes the ***Transfer Grant*** listed in the Scholarships section of this handbook.
   C) The lower-level General Education requirements at ODU are automatically met ***if the student completes*** the A.S. degree in Engineering from TCC. This gives the student great flexibility in that general education courses transfer as a block and do not need to match on a course-by-course basis. This is illustrated in the diagram shown below.

TCC General Education Courses	
Course	**Cr.**
History Elective	3
Social Science Elective	3
Humanities Science Elective	3
Humanities Science Elective	3
Total Credits:	12



ODU General Education Courses	
Course	**Cr.**
Interpreting the Past	3
Human Behavior	3
Human Creativity	3
Literature	3
Total Credits:	12

3. ODU Speech requirement – Is CST 100 (Public Speaking) needed or not?
   The ODU engineering departments do not seem to be consistent on this issue. Each department was emailed in August 2020 with the following results:
   - ECE – COMM 101R waived with AS degree in Engineering
   - CE – COMM 101R waived with AS degree in Engineering if the AS degree includes a speech component (it is unclear how they will interpret this).
   - ME – COMM 101R is not waived. Students should take CST 100 at TCC or COMM 101R at ODU.

Minors (for all ODU engineering disciplines)

Minors for engineering students are very popular at ODU. Minors appear on your transcripts and also have the advantage of satisfying the upper-division General Education requirement. The number of courses required for each minor varies. Some restrictions apply.

Minors include:

- Minor in ***AeroSpace Engineering***
- Minor in ***Motorsports Engineering***
- Minor in ***Biomedical Engineering***
- Minor in ***Civil Engineering***
- Minor in ***Civil Engineering Technology - Construction***
- Minor in ***Computer Engineering***
- Minor in ***Electrical Engineering***
- Minor in ***Electrical Engineering Technology***
- Minor in ***Engineering Management***
- Minor in ***Environmental Engineering***
- Minor in ***Global Engineering***
- Minor in ***Marine Engineering***
- Minor in ***Mechanical Engineering***
- Minor in ***Mechanical Engineering Technology***
- Minor in ***Military Leadership***
- Minor in ***Modeling & Simulation***

Reference: Batten College of Engineering & Technology Minors - Old Dominion University (odu.edu)

ODU Electrical Engineering
Transfer Information

Transferring to ODU's Electrical Engineering Program:

1. Once you have applied and received a letter of acceptance contact the Electrical and Computer Engineering (ECE) office at 683-3741 for an appointment for transcript evaluation, registration, and questions.

2. See the ODU Electrical Engineering Curriculum Worksheet on the following page.

3. The Electrical Engineering curriculum at ODU contains 4 sophomore-level electrical/computer engineering courses and students should have all 4 of these courses in order to move smoothly into the junior-level electrical engineering courses. All 4 of these courses can be taken at TCC as indicated by the chart below. Be sure to check the Annual Schedule on page 13 since each course is not offered every semester at TCC.

TCC Course Number and Title	TCC Credits	ODU Course Number	ODU Credits
EGR 271 Circuit Theory I	3	ECE 201	3
EGR 272 Circuit Theory II	3	ECE 202	3
EGR 262 Fundamental Circuits Lab	2	ECE 287	2
EGR 270 Fundamentals of Computer Enginering	4	ECE 241	4

Overall Recommendation:

1. Take the 4 electrical courses listed above as **Approved Engineering Electives** at TCC (although a minimum of only 9 credits are needed for the A.S. degree at TCC).
2. Complete the A.S. degree in Engineering at TCC.
3. Optional: TCC students can take EGR 140 to satisfy ODU's requirement for a non-major Engineering Elective. Note that this requirement can often be satisfied at ODU if a minor is selected.

Additional transfer information is available at TCC's and ODU's web sites:

ODU Electrical & Computer Engineering Home Page: http://www.odu.edu/ece
ODU Curriculum Sheets for VCCS Students: https://www.odu.edu/academics/programs/curriculum-sheets
TCC Transfer Information: https://www.tcc.edu/academics/degrees/transfer/transfer-agreements

ODU Electrical Engineering Transfer Worksheet (Unofficial)

(BSEE Degree: 2020-21 Catalog)

ODU Course #	ODU Course Title	Cr	√	Transfer Credit from TCC
ENGL 110C	English Composition	3		ENG 111
MATH 211	Calculus I	4		MTH 263
CHEM 121N/122N	Chemistry I and Chemistry Lab	4		CHM 111
ENGN 110	Engineering & Tech I	2		EGR 121 or EGR 120
COMM 101R	Public Speaking	3		A. S. Degree
MATH 212	Calculus II	4		MTH 264
CS 150 or ENGN 150	Intro to Programming	4		EGR 125 or CSC 201
CHEM 123N	Chemistry II	3		CHM 112
PHYS 231N	University Physics I	4		PHY 241
ECE 111	Information Literacy for ECE	2		EGR 122 or EGR 110
ECE 201	Circuit Analysis	3		EGR 271
GEN ED	Interpreting the Past	3		A. S. Degree *
MATH 307(280)	Differential Equations	3		MTH 267
PHYS 232N	University Physics II	4		PHY 242
ECE 241	Fund of Computer Engineering	4		EGR 270
ECE 202	Circuits, Signals & Linear Sys.	3		EGR 272
ECE 287	Circuits Lab	2		EGR 262
ENGN Elective	Non-major Engineering Elective	3		EGR 140 (see Note 3 on previous page)
MATH 312 (285)	Calculus III	4		MTH 265
ENGL 231C	Technical Writing	3		ENG 131
ECE 303	Electrical Power	3		
ECE 313	Electronic Circuits	4		
ECE 332	Micro. Materials & Processes	3		
GEN ED	Human Creativity	3		A. S. Degree *
ECE 302	Linear Systems	3		
ECE 304	Probability, Statistics & Reliability	3		
ECE 387 or Tech. Elect.	Microelec. Fabrication Lab	3		
ECE 381	Discrete Time Signal Processing	3		
GEN ED	Literature	3		A. S. Degree *
ECE 323	Electromagnetics	3		
ECE 485W	EE Design I	3		
ECE 486	Prep ECE Design II	1		
ECE 4XX	ECE Technical Elective	3		
ECE 4XX	ECE Technical Elective	3		
GEN ED - upper	Upper Division Gen Education	3		
ENMA 480	Engineering Ethics	3		
ECE 487	ECE Design II	2		
ECE 4XX	ECE Technical Elective	3		
ECE 4XX	ECE Technical Elective	3		
GEN ED	Human Behavior	3		A. S. Degree *
GEN ED - upper	Upper Division Gen Education	3		
	Total credits in B.S. degree:	**127**		**Max Total Transfer Credits: 74**

Note: The ODU Foreign Language Requirement is waived if the A. S. Degree has been completed.

* If the A.S. Degree is completed, the 12 credits of TCC General Education requirements transfer as a block to cover the 12 credits of ODU General Education requirements (see chart on page 20).

ODU Computer Engineering
Transfer Information

Transferring to ODU's Computer Engineering Program:

1. Once you have applied and received a letter of acceptance, contact the Electrical and Computer Engineering (ECE) office at 683-3741 for an appointment for transcript evaluation, registration, and questions.
2. See the ODU Computer Engineering Curriculum Worksheet on the following page.
3. The Computer Engineering curriculum at ODU contains 4 sophomore-level electrical/computer engineering courses and students should have all 4 of these courses in order to move smoothly into the junior-level electrical engineering courses. All 4 of these courses can be taken at TCC as indicated by the chart below. Be sure to check the Annual Schedule on page 13 since each course is not offered every semester at TCC.

TCC Course Number and Title	TCC Credits	ODU Course Number	ODU Credits
EGR 271 Circuit Theory I	3	ECE 201	3
EGR 272 Circuit Theory II	3	ECE 202	3
EGR 262 Fundamental Circuits Lab	2	ECE 287	2
EGR 270 Fundamentals of Computer Enginering	4	ECE 241	4

4 The Computer Engineering program at ODU requires 2 computer science courses (based on the language C++). These 2 courses can be taken at TCC as indicated by the chart below.

TCC Course Number and Title	TCC Credits	ODU Course Number	ODU Credits
EGR 125 Intro to Engineering Methods or CSC 201 Computer Science I	4 4	CS 150 or ENGN 150	4
CSC 210 Programming C++	4	CS 250	4

Note: Some students take CSC 110 before CSC 201 if they would like a slower introduction into programming concepts using C++. CSC 110 at TCC is equivalent to CSC 148 at ODU, but these courses are not required and most engineering students do not take them.

5. The Computer Engineering program is the only Engineering program at ODU ***does not require*** TCC's MTH 265 (Calc III). It is recommended that you substitute CSC 210 in place of MTH 265 for graduation purposes at TCC. A waiver is required for this substitution. See Paul Gordy in H-115 for the waiver.

Overall Recommendation:

1. Take the 4 Electrical/Computer Engineering courses listed in the first table above as **Approved Engineering Electives** at TCC (although a minimum of only 9 credits are needed for the A.S. degree at TCC).
2. Take the 2 Engineering/Computer Science courses listed in the second table above.
3. Do not take MTH 265 at TCC (obtain a waiver to replace it with CSC 210 or with additional Approved Engineering Electives).
4. Complete the A.S. degree in Engineering at TCC.

Additional transfer information is available at TCC's and ODU's web sites:

ODU Electrical & Computer Engineering Home Page: http://www.odu.edu/ece
ODU Curriculum Sheets for VCCS Students: https://www.odu.edu/academics/programs/curriculum-sheets
TCC Transfer Information: https://www.tcc.edu/academics/degrees/transfer/transfer-agreements

ODU Computer Engineering Transfer Worksheet (Unofficial)

(BSCpE Degree: 2020-21 Catalog)

ODU Course #	ODU Course Title	Cr	√	Transfer Credit from TCC
ENGL 110C	English Composition	3		ENG 111
MATH 211	Calculus I	4		MTH 263
CHEM 121N/122N	Chemistry I and Chemistry Lab	4		CHM 111
ENGN 110	Engineering & Tech I	2		EGR 121 or EGR 120
COMM 101R	Public Speaking	3		A. S. Degree
MATH 212	Calculus II	4		MTH 264
CS 150 or ENGN 150	Intro to Programming	4		EGR 125 or CSC 201
CHEM 123N	Chemistry II	3		CHM 112
PHYS 231N	University Physics I	4		PHY 241
ECE 111	Information Literacy for ECE	2		EGR 122 or EGR 110
ECE 201	Circuit Analysis	3		EGR 271
PHYS 232N	University Physics II	4		PHY 242
GEN ED	Literature	3		A. S. Degree *
MATH 307 (280)	Differential Equations	3		MTH 267
ECE 241	Fund of Computer Engineering	4		EGR 270
ECE 202	Circuits, Signals & Linear Sys.	3		EGR 272
ECE 287	Circuits Lab	2		EGR 262
CS 381	Discrete Structures	3		
CS 250	Problem Solving & Programming	4		CSC 210
CS 252	Intro to UNIX	1		ITN 171 (4 cr)
ENGL 231C	Technical Writing	3		ENG 131
ECE 313	Electronic Circuits	4		
ECE 302	Linear Systems	3		
ECE 341	Digital System Design	3		
CS 361	Adv. Data Structures	3		
GEN ED	Human Creativity	3		A. S. Degree *
ECE 304	Probability, Statistics & Reliability	3		
ECE 346	Microcontrollers	3		
CS 350	Software Engineering	3		
ECE 381	Discrete Time Signal Processing	3		
ECE xxx	ECE Technical Elective	3		
ECE 484W	CMEN Design I	3		
ECE 443	Computer Architecture	3		
ECE 486	Prep ECE Design II	2		
ENMA 480	Engineering Management	3		
ECE 4xx	ECE Technical Elective	3		
GEN ED	Interpreting the Past	3		A. S. Degree *
ECE 487	ECE Design II	2		
CS 471	Operating Systems	3		
ECE 4xx	ECE Technical Elective	3		
GEN ED	Human Behavior	3		A. S. Degree *
ECE 4xx	ECE Technical Elective	3		
	Total credits in B.S. degree:	**128**		**Max Total Transfer Credits: 72**

Note: The ODU Foreign Language Requirement is waived if the A. S. degree in Engineering has been completed.

* If the A.S. Degree is completed, the 12 credits of TCC General Education requirements transfer as a block to cover the 12 credits of ODU General Education requirements (see chart on page 20). Additionally, ODU's speech requirement, COMM 101R, is satisfied by completing the A.S. degree in engineering.

ODU Mechanical Engineering
Transfer Information

Transferring to ODU's Mechanical Engineering Program:

1. Once you have applied and received a letter of acceptance, contact the Academic Advisor for Mechanical Engineering and Mechanics (MEM), at 683-6363, for an appointment for transcript evaluation, registration, and questions.
2. See the ODU Mechanical Engineering Curriculum Worksheet on the following page.
3. Take MTH 283 – Probability & Statistics (3 cr) and EGR 247 – Mechanics of Materials Lab (1 cr) in place of CHM 112 (4 cr). See Paul Gordy or William Simmons and they can complete a Course Substitution Form for you.
4. Students transferring to ODU will lack MEM 201 and MEM 203 (Material Science and Lab), but these courses are not prerequisites for most junior level courses and can easily fit into your schedule at some point once you transfer to ODU.

Overall Recommendation:

1. Take EGR 140, EGR 245 and EGR 246 at **Approved Engineering Electives** at TCC.
2. Complete the A.S. degree in Engineering at TCC.
3. Take MTH 283 – Probability & Statistics (3 cr) and EGR 247 – Mechanics of Materials Lab (1 cr) in place of CHM 112 (4 cr).
4. Take MTH 283 for additional transfer credit to ODU.

Options and Minors for ODU Mechanical Engineering Students

Upon completion of the first semester of the junior year, ODU Mechanical Engineering students must pick one of the three options or specializations shown below or pick one of the minors listed on page 21. Note on the following page that several senior courses are listed as "ME Option". Those courses must be chosen from the list of courses provided below for the option/minor selected. Additional restrictions may apply.

- Option (or concentration) in ***Power/Energy***
- Option (or concentration) in ***Mechanical Systems/Design***
- Option (or concentration) in ***AeroSpace Engineering***

Additional transfer information is available at TCC's and ODU's web sites:

ODU Mechanical Engineering Home Page: http://www.odu.edu/mae
ODU Curriculum Sheets for VCCS Students: https://www.odu.edu/academics/programs/curriculum-sheets
TCC Transfer Information: https://www.tcc.edu/academics/degrees/transfer/transfer-agreements

ODU Mechanical Engineering Transfer Worksheet (Unofficial)

(BSME Degree: 2020-21 Catalog)

ODU Course #	ODU Course Title	Cr	√	Transfer Credit from TCC
ENGN 110	Freshmen Engr. & Technology I	2		EGR 121 or EGR 120
MATH 211	Calculus I	4		MTH 263
CHEM 121N/122N	Chemistry I and Chemistry Lab	4		CHM 111
ENGL 110C	English Composition	3		ENG 111
COMM 101R	Public Speaking	3		CST 100
MET 230	Engineering Graphics for Mech. Design	3		EGR 122 or EGR 110
MATH 212	Calculus II	4		MTH 264
CS 150 or ENGN 150	Problem Solving & Programming I	4		EGR 125
PHYS 231N	University Physics I	4		PHY 241
MAE 111	Information Literacy & Research	2		A.S. Degree *
MAE 201	Material Science	3		
MAE 203	ME Lab 1 - Materials	1		
MAE 204	Statics	3		EGR 140
PHYS 232N	University Physics II	4		PHY 242
ENGL 231C	Technical Writing	3		ENG 131
MATH 312 (285)	Calculus III	4		MTH 265
MAE 205	Dynamics	3		EGR 245
MAE 220	Egr. Mech. II - Solid Mechanics	3		EGR 246
MAE 225	ME Lab II - Solid Mechanics	1		EGR 247
MATH 307 (280)	Differential Equations	3		MTH 267
STAT 330	Probability & Statistics	3		MTH 283
GEN ED	Interpreting the Past	3		A. S. Degree *
MAE 311	Thermodynamics I	3		
MAE 303	Fluid Mechanics	3		
MAE 305	ME Lab III - Thermo/Fluids	1		
MAE 340	Computational Methods in ME	3		
GEN ED	Human Creativity	3		A. S. Degree *
GEN ED	Literature	3		A. S. Degree *
MAE 312	Thermodynamics II	3		
MAE 332	Mechanical Engineering Design I	3		
MAE 315	Heat and Mass Transfer	3		
MAE 336	Electromechanical Systems	3		
GEN ED	Human Behavior	3		A. S. Degree *
ENMA 480	Ethics & Philosophy in Engineering	3		
MAE 434W	Project Design and Management I	3		
MAE 433	Mechanical Engineering Design II	3		
MAE 436	Dynamic Systems and Control	3		
MAE Option Course	ME Option ** Senior Elective	3		
GEN ED - upper	Upper Division/Cluster	3		
MAE 435	Project Design and Management II	3		
MAE Option Course	ME Option ** Senior Elective	3		
MAE Option Course	ME Option ** Senior Elective	3		
GEN ED - upper	Upper level cluster/minor	3		
	Total credits in B.S. degree:	**128**		**Max Total Transfer Credits: 72**

Note: The ODU Foreign Language Requirement is waived if the A. S. degree in Engineering has been completed.

* If the A.S. Degree is completed, the 12 credits of TCC General Education requirements transfer as a block to cover the 12 credits of ODU General Education requirements (see chart on page 20). Additionally, ODU's speech requirement, COMM 101R, is satisfied by completing the A.S. degree in engineering.

** ME students must declare 1 oof 3 possible options or declare a minor before taking ME Options. See previous page.

ODU Civil Engineering Transfer Information

ODU does not offer a separate BS degree in ***Environmental Engineering***. Students that wish to focus on environmental engineering can still specialize in the environmental area by selecting related electives in this area. Students can also continue for MS or PhD degrees in either Civil or Environmental Engineering. Note ODU's approach is that same approach found at many universities, including Virginia Tech.

The Civil Engineering program at ODU allows students to specialize in various disciplines within Civil Engineering, including:

- Geotechnical
- Structural
- Water Resources
- Environmental
- Transportation

Transferring to ODU's Civil Engineering Program:

1. Once you have applied and received a letter of acceptance, contact the Civil and Environmental Engineering Department office at 683-3753 for an appointment for transcript evaluation, registration, and questions.
2. ODU does not require EGR 247 (Mechanics of Materials Lab) for the Civil Engineering program, but TCC Engineering faculty recommend that students take it anyway. Taking the lab (EGR 247) along with the course (EGR 246) gives the student practical experience in experiments involving the mechanics of materials.
3. ODU's CE program has dropped the requirement for a C++ programming course such as EGR 125. It is recommended that students take GOL 105 or BIO 101 instead which will also satisfy the Science Elective in ODU's CE curriculum. In most cases, GOL 105 is recommended.

Overall Recommendation:

1. Take EGR 140, EGR 245, and EGR 246 as **Approved Engineering Electives** at TCC.
2. Complete the A.S. degree in Engineering at TCC.
3. Take GOL 105 or BIO 101 instead of EGR 125 at TCC.
4. Consider taking EGR 247.

Additional transfer information is available at TCC's and ODU's web sites:

ODU Civil Engineering Home Page: http://www.odu.edu/cee
ODU Curriculum Sheets for VCCS Students: https://www.odu.edu/academics/programs/curriculum-sheets
TCC Transfer Information: https://www.tcc.edu/academics/degrees/transfer/transfer-agreements

ODU Civil Engineering Transfer Worksheet (Unofficial)

(BSCE Degree: 2020-21 Catalog)

ODU Course #	ODU Course Title	Cr	√	Transfer Credit from TCC
ENGN 110	Freshman Engineering & Technology I	2		EGR 121 or EGR 120
CHEM 121N/122N	Chemistry I and Chemistry Lab	4		CHM 111
ENGL 110C	English Composition	3		ENG 111
GEN ED	Human Creativity	3		A. S. Degree *
MATH 211	Calculus I	4		MTH 263
COMM 101R	Public Speaking	3		A. S. Degree *
CHEM 123N	Chemistry II	3		CHM 112
MATH 212	Calculus II	4		MTH 264
PHYS 231N	University Physics I	4		PHY 241
CEE 111	Information Literacy & Research	2		EGR 122 or EGR 110
Science Elect.	BIO 110N/111N or OEAS 111N	4		BIO 101 or GOL 105 (GOL preferred)
MATH 312 (285)	Calculus III	4		MTH 265
CEE 204	Statics	3		EGR 140
PHYS 232N	University Physics II	4		PHY 242
CEE 240	Geographic Information Systems	3		
CEE 220	Mechanics of Deformable Bodies	3		EGR 246
CEE 219	Surveying for Engineers	1		CIV 171 (4 cr)
GEN ED	Literature	3		A. S. Degree *
MATH 307 (280)	Differential Equations	3		MTH 267
ENGL 211C	English Composition	3		ENG 131
CEE 205	Dynamics	3		EGR 245
CEE 304	Probability, Statistics, and Risk CE	3		
CEE 350	Environmental Pollution & Control	3		
CEE 330	Hydromechanics	3		
CEE 305	C & E Engineering Computations	4		
CEE 320	Civil Engineering Materials	3		
CEE 323	Soil Mechanics	3		
CEE 340	Hydraulics & Water Resources	3		
GEN ED	Interpreting the Past	3		A. S. Degree *
CEE 324	Soil Mechanics Laboratory	1		
CEE 341	CE Hydraulics & Water Resources Lab	1		
CEE 370	Transportation Fundamentals	3		
CEE 310	Structural Engineering I	3		
CEE 410	Concrete Design I	3		
CEE 401	CE Design Project and Professional Pract.	3		
CEE 430	Foundation Engineering	3		
CEE 402	Professional Practice Engineering	1		
GEN ED – upper	Gen Ed Upper Level Requirement	3		
GEN ED	Human Behavior	3		A. S. Degree *
CEE 4XX	Transp. Or Environ Engr. Elective	3		
CEE 4XX	Civil Engineering Elective	3		
GEN ED - upper	Gen Ed Upper Level Requirement	3		
ENMA 480	Ethics & Philosophy in Engr. Apps.	3		
CEE 403W	Civil Engineering Design Project	3		
	Total credits in B.S. degree:	**130**		**Max Total Transfer Credits: 69**

Note: The ODU Foreign Language Requirement is waived if the A. S. degree in Engineering has been completed.

* If the A.S. Degree is completed, the 12 credits of TCC General Education requirements transfer as a block to cover the 12 credits of ODU General Education requirements (see chart on page 20). Additionally, ODU's speech requirement, COMM 101R, is satisfied by completing the A.S. degree in engineering.

Virginia Tech Transfer Information

Virginia Tech's College of Engineering is consistently ranked as one of the top engineering colleges in the nation in the quality of its undergraduate education. Virginia Tech offers Bachelor of Science degrees in the following fields:

Aerospace Engineering	Biological Systems Engineering	Chemical Engineering
Civil Engineering	Computer Engineering	Engineering Science and Mechanics
Electrical Engineering	Material Science & Engineering	Industrial and Systems Engineering
Ocean Engineering	Mechanical Engineering	Mining & Minerals Engineering
Computer Science	Biomedical Engineering	

Articulation Agreement with Virginia Tech:

In 1992 a Guaranteed Admission Agreement (GAA) was developed between Virginia Tech and all colleges in the VCCS, including TCC. The GAA guarantees transfer admission into the College of Engineering at Virginia Tech for all students who complete the A.S. degree in Engineering and have a minimum GPA of 3.2 (with some other restrictions). A copy of the articulation agreement is available at https://vt.edu/content/dam/vt_edu/admissions/forms/VT-VCCS_2017-2020_GE-GAA.pdf

Notes on the Guaranteed Admission Agreement (GAA):

1. There are several important reasons to ***complete the A.S. degree in Engineering*** before transferring to Virginia Tech:
   - Admission is only ***guaranteed*** if you complete the A.S. degree in Engineering (in addition to other requirements).
   - Students receive block credit for general education requirements. All degrees from Virginia Tech must satisfy Areas 1-7 of the Virginia Tech Core Curriculum (recently replaced by "Pathways"). Completing the A.S. degree* automatically satisfies Areas 1-7 of the Core Curriulum (also satisfies Pathways). If the degree is not completed, students must be sure to take specific general education courses to satisfy each of these areas.
   - The ***Leo Padis Scholarship*** is available only to transfer students from Virginia Community Colleges that complete the A.S. degree in Engineering. The application is available online at: https://eng.vt.edu/admissions/undergraduate-admissions-information/scholarships-for-prospective-students.html
   - Speakers from Virginia Tech typically visit TCC each Fall semester. They always encourage students to compete the A.S. degree and indicated that students that complete the degree before transferring have a higher rate of success.
2. When students are accepted for transfer admission to Virginia Tech, they are placed in the College of Engineering and admission into the engineering program (e.g., Civil, Electrical, Mechanical, etc.) of your choice is not guaranteed. Students can apply for admission into a specific department after completing at least 12 credits at Virginia Tech and satisfying all freshman courses. If the student has at least a 3.0 GPA then they can transfer into the department of their choice. Note that if a student does not gain entry into the department of their choice after the first semester, they may be restricted from taking courses in this major, so it is important to have a successful first semester). ***Note: This will change on a trial basis for Fall 2021 admission and students will be admitted directly into the department of their choice. This is good news!***
3. 3.2 is the minimum GPA to have ***guaranteed*** admission to Virginia Tech, but you might be accepted with a lower GPA.
4. Students can apply to transfer before completing the A.S. degree in Engineering (perhaps after the freshman year), but the guaranteed admission agreement does not apply. A minimum GPA of 3.5 is recommended if you plan to apply without completing the A.S. degree in Engineering.
5. The Articulation Agreement shows that 60 credits in the appropriate areas are required, but you can transfer up to half of the credits in the B.S. degree (typically around 64 credits). You might

check the Virginia Tech Transfer Guide to see what other courses will transfer. If you have more than 64 transferrable credits, Virginia Tech will work with you when you arrive to determine exactly which credits will be transferred.

5. Students may also be interested in knowing that some of the less common areas of engineering such as Biological Engineering and Mining & Minerals Engineering often have some advantages such as
   - less stringent transfer requirements (often less than a 3.0 GPA is required for the first 12 credits completed at Virginia Tech)
   - smaller class sizes
   - scholarships in these areas are much easier to obtain. As an example, it is reported that most students in the Mining & Minerals Engineering program are on scholarship (the mining industry provides most of the scholarships).

Tablet Computers:

Virginia Tech requires all engineering students to own a tablet computer as well as a specific list of software. The requirements in terms of hardware and software change each year so you should request information concerning the current requirements (since you will transfer in to VT as a junior, look for the requirements for the junior class). If you do not already own a tablet computer, Virginia Tech sells computers, software, and service agreements that you might wish to consider. Financing is available to finance computers over the length of your degree program.

Scholarship Information:

Scholarships specifically for transfer students are sometimes hard to obtain, but Virginia Tech does offer one such scholarship. The Leo A. Padis Scholarship is available only to students graduating from a Virginia Community College and transferring into Virginia Tech's College of Engineering.

- The applicant must complete the A.S. degree to be eligible.
- Selection is based on academic performance.
- The number of scholarships varies, but is typically 4 or more at $1000/year for each scholarship.
- The deadline for application is typically June 1.
- The application is available at: https://eng.vt.edu/admissions/undergraduate-admissions-information/scholarships-for-prospective-students.html

Important Online Resources

- ***Virginia Tech College of Engineering***: http://www.eng.vt.edu/
- ***Curriculum Checksheets*** – visit the engineering department of your choice online and look for curriculum "check sheets". The check sheets list detailed requirements for each engineering degree by the graduation year. For example: http://www.ece.vt.edu/ugrad/curriculum/index.php
- ***VCCS to Virginia Tech Transfer Guide*** - http://www.tranguide.registrar.vt.edu/
- ***Course recommendations by Virginia Tech major:***
  https://www.tranguide.registrar.vt.edu/2020/by-major/me.html
  Note: This site may not show all transferrable courses. For example, Civil Engineering does not list EGR 245, but the Civil Engineering checksheet shows that EGR 245 can be used to satisfy required Engineering Science electives. Similarly, this site does not correctly show for EE students that EGR 125 transfers as ECE 1574 and that EGR 140 can be used as an engineering elective.
- ***Virginia Tech courses and VCCS transfer equivalents:***
  https://www.tranguide.registrar.vt.edu/2020/vccs.html

Applying for Admission to Virginia Tech:

Students should apply for transfer admission online at: https://vt.edu/admissions/transfer.html

Fall admission: Apply by January 15 (technically March 1, but Jan 15 for possible scholarships)
Spring admission: October 1
Summer admission: Same as fall admission. If you are admitted for the fall semester, you can also attend the summer semester if you wish.

There are no advantages to applying early during the Fall semester, so wait until your Fall semester grades are on your transcripts before applying. Students will be notified concerning their acceptance by April 1 or as soon as possible.

Students considering Virginia Tech are strongly encouraged to obtain information early on the engineering program of their choice. This will allow them to compare the 2-year curriculum at TCC to the desired Virginia Tech curriculum and allow them to plan their schedules wisely. Virginia Tech offers accelerated summer sessions where students may take courses that they are lacking so that they can make a smooth transition into the junior year of their program. Virginia Tech tries to offer courses which transfer students often lack during the summer.

Transfer Student Orientation: Virginia Tech hosts an orientation for newly accepted transfer students each June. See details at: https://nsp.vt.edu/orientation/Transfer_Orientation.html

Other notes related to admission:

1. If you transfer less than 45 credits to Virginia Tech, you must also send high school transcripts and SAT scores.
2. International students must score a minimum score of 550 on the TOEFL (not required if ENG 111-112 have been completed).
3. No students are accepted for transfer without ENG 111-112 or the equivalent.
4. Virginia Tech has a foreign language requirement. If you are using high school foreign language courses to meet this requirement be sure to send high school transcripts. Students who speak a native language other than English are exempt from this requirement. High school transcripts are only required to verify foreign language credit.
5. If you have any special circumstances to explain (such as a low GPA due to old grades in another curriculum) include a letter of explanation with your application.
6. Send transcripts from all colleges that you have attended. Just because TCC gave you credit for a course from another college, it is not guaranteed that Virginia Tech will do so.
7. Only courses in which you received a grade of C or better will transfer.

For additional information, contact:

Paul Gordy, Engineering Program Head, TCC - Virginia Beach Campus
Office: H-115 (Advanced Technology Center)
Phone: 822-7175
E-mail: Pgordy@tcc.edu

Transferring into Electrical or Computer Engineering at Virginia Tech

Virginia Tech recently revised many of their courses in Electrical & Computer Engineering (ECE). They have switched to a studio format where topics from traditional ECE courses are introduced as needed. For example, one course might use concepts from circuits, digital logic and C++ programming. Additionally, C++ programming concepts might be taught in several courses rather than in a single programming course. As a result, engineering courses from TCC will now only transfer as a block for ECE and not as individual courses.
Shown below is a table provided by Virginia Tech's ECE Department during a recent conference (modified to add the number of credits for each course).
Note that the first option (Table 4a) is ***strongly recommended*** or else the transfer student might be a semester behind as ECE 2024 is a prerequisite for several following ECE courses.

Table 4a. Tidewater Community College (with EGR 262 Circuits Lab)

TCC Courses (all courses below must be completed)	VT Equivalent Transfer Credit (all of the below will be awarded)
EGR 125 Introduction to Engineering Methods (4 cr) EGR 262 Fundamental Circuits Lab (2 cr) EGR 270 Fundamentals of Computer Engineering (4 cr) EGR 271 Circuit Theory I (3 cr) EGR 272 Circuit Theory II (3 cr) Total: 16 cr	ECE 1004 Intro to ECE Concepts (3 cr) ECE 2024 Circuits and Devices (3 cr) ECE 2514 Computational Engineering (3 cr) ECE 2544 Fundamentals of Digital Systems (3 cr) Total: 12 cr

Table 4b. Tidewater Community College (without EGR 262 Circuits Lab)

TCC Courses (all courses below must be completed)	VT Equivalent Transfer Credit (all of the below will be awarded)
EGR 125 Introduction to Engineering Methods (4 cr) EGR 270 Fundamentals of Computer Engineering (4 cr) EGR 271 Circuit Theory I (3 cr) EGR 272 Circuit Theory II (3 cr) Total: 14 cr	ECE 1004 Intro to ECE Concepts (3 cr) ECE 2514 Computational Engineering (3 cr) ECE 2544 Fundamentals of Digital Systems (3 cr) Total: 9 cr

Transfer of courses to Virginia Tech

Virginia Tech provides an online transfer guide at: http://www.tranguide.registrar.vt.edu/
Note that only certain courses below may be needed for specific engineering disciplines at Virginia Tech. For example, all disciplines require all of the MTH courses listed below whereas EGR 271-272 are only required for electrical and computer engineering and CHM 241&245 are only required for chemical engineering. See the VT department checksheet for more information.

TCC Course #	TCC Course Title	TCC Cr	VT Course #	VT Cr
EGR 121 (EGR 120)	Foundations of Engineering	3	ENGE 1215	2
EGR 122 (EGR 11)	Engineering Design	2	ENGE 1216	2
EGR 125	Intro to Engineering Methods (C++) – see note below for ECE	4	ENGE 2324 or ENGE 2314	1, 2 or 3
EGR 140	Statics	3	ESM 2104	3
EGR 206	Engineering Economics (for CE and some other disciplines)	3	ISE 2014	2
EGR 245	Dynamics	3	ESM 2304	3
EGR 246	Mechanics of Materials	3	ESM 2204	3
EGR 125, 270, 271, 272	These 4 TCC EGR courses transfer as a group for 3 VT ECE courses	14	ECE 1004, 2514, 2544	9
EGR 125, 262, 270, 271, 272	These 5 TCC EGR courses transfer as a group for 4 VT ECE courses	16	ECE 1004, 2024, 2514, 2544	12
GOL 105	Geology (only for Mining Engineering)	4	GEOL 2104	4
MTH 166	Linear Algebra	3	MATH 2114	3
MTH 263	Calculus I	4	MATH 1225	4
MTH 264	Calculus II	4	MATH 1226	4
MTH 265	Calculus III	4	MATH 2204	3
MTH 267	Differential Equations	3	MATH 2214	3
MTH 266 **	Linear Algebra	3	MATH 2114	3
PHY 241 - 242	University Physics I - II	8	PHYS 2305 - 2306	8
CHM 111	Chemistry I	4	CHEM 1035, CHEM 1045	4
CHM 112	Chemistry II	4	CHEM 1036, CHEM 1046	4
CHM 111 – 112	Chemistry I-II	8	CHEM 1074-1084	3
CHM 241	Organic Chemistry I	3	CHEM 2535	3
CHM 245	Organic Chemistry I Lab	2	CHEM 2545	2
CHM 242	Organic Chemistry II	3	CHEM 2536	3
CHM 246	Organic Chemistry II Lab	2	CHEM 2546	2
ENG 111	English Composition I	3	ENGL 1105	3
ENG 112	English Composition II	3	ENGL 1106	3
HIS Elect	History Elective	3	See Note	3
Soc Sci Elect	Social Science Elective	3	See Note	3
Hum Elect	Humanities Elective	3	See Note	3
CSC 201	Computer Science I	4	CS 1044	3

Note: If students satisfy the articulation agreement (complete the A.S. degree in Engineering with a minimum 3.2 GPA), then general education requirements are transferred as a block, so the exact courses used for History, Social Science, and Humanities electives do not matter. If students do not complete the A.S.degree in Engineering, then specific courses should be selected in order to satisfy Virginia Tech's Pathways (lower level general education requirements). However, some programs at VT specifically require MicroEconomics, so ECO 202 should be selected as a Social Science elective for those programs (Aero, Civil, Ocean, Material Science, and Construction Engineering & Management.)
Virginia Tech does not require CHM 112 for any engineering majors except chemical engineering.
** Recent changes at VT have made Linear Algebra a prerequisite to several key ME and ECE courses, so it is critical that students transferring into mechanical, electrical and computer engineering (and possibly others) take MTH 166 before transferring.

Virginia Commonwealth University (VCU) Transfer information:

In addition to the math, science, and general education courses, the Associate of Science degree in Engineering at TCC requires 18 engineering (EGR) electives. Generally, the first 9 of these 18 credits are fulfilled by EGR110 (3 credits), EGR120 (2 credits), and EGR125 (4 credits) for all engineering students. Refer to the table on page 10 for the last 9 of the 18 credits, depending on the academic specialization desired.

Guaranteed Admission Agreement with VCU:

Graduate with a minimum of a 3.0 cumulative GPA (as computed under VCCS policy) in an Associate of Science or Associate of Arts and Sciences program in Engineering or Science from a Virginia community college, with a grade of B or better in all math, science and engineering courses. Other conditions apply, please see full agreement for details.

Notes on the Guaranteed Admission Agreement (GAA):

Students with competitive academic records, but not meeting the GAA requirements are encouraged to apply.

Scholarship Information:

Fall applicant transfer students with an Associate of Science or Associate of Arts and Sciences program in Engineering or Science are considered for merit based aid. In addition to transfer student merit aid, students may qualify for the Wright Engineering Access Scholarship Program. For questions regarding transfer scholarship opportunities, contact https://egr.vcu.edu/admissions/scholarships/

Important Online Resources

VCU Engineering Guaranteed Admission: GAA_Engineering_VCCS.pdf (vcu.edu)
VCU Transfer Guide: http://www.transfer.vcu.edu/prospective/equivalency/
VCU Bulletin: http://bulletin.vcu.edu/undergraduate/

Applying for Admission to VCU:

Please see http://www.ugrad.vcu.edu/apply/transfer/ for the undergraduate transfer application process

Transfer of courses to VCU

VCU provides an online transfer guide at: http://www.transfer.vcu.edu/prospective/equivalency/
Note that only certain courses below may be needed for specific engineering disciplines at VCU. For example, all disciplines require MTH 263-264, whereas EGR 271-272 are only required for electrical and computer engineering, and CHM 241 & 245 are only required for chemical, life science, or biomedical engineering. See the individual VCU department checksheet for more information.

TCC Course #	TCC Course Title	TCC Cr	VCU Course #	VCU Cr
BIO102	General Biology II	4	BIOL 152 and BIOZ 152 Intro to Biological Science II and Lab	4
BIOLxxx			Other BIO courses may apply depending on program, specialization or track.	
CSC110	Intro to Computers	3		
CSC205	Computer Organization		CMSC 311 Computer Organization	3
ITN 171	Intro to UNIX			
CST 100	Public Speaking	3		
EGR 122	Engineering Design	3	EGRE 101 (4 cr) (students must take EGR 121 AND EGR 122 to receive credit)	2
EGR 121	Foundations of Engineering	2	ENGR1XX and EGMN 103 or EGMN 190 Introduction to Engineering and Mech and	2

			Nuclear Engineering Practicum I or Intro to Mechanical and Nuclear Engineering	
EGR 125	Intro to Engineering Methods (C++)	4	EGRE 245	4
EGR 140	Statics	3	EGMN 102 Engineering Statics	3
EGR 245	Dynamics	3	EGMN 201 Dynamics and Kinematics	3
EGR 246	Mechanics of Materials	3	EGMN 202 Mechanics of Deformables	3
EGR 262	Fundamental Circuits Lab		See EGR 271-272	
EGR 270	Fund of Computer Engineering	4	EGRE 254	3
EGR 271-272**	Circuit Theory I-II	6	EGRE 206 AND EGRE 207 **IF** students complete EGR 271,272 and EGR 262	8
GOL 105	Geology	4	ENVS 105 and ENVZ 105 Physical Geology and Lab	4
MTH 263	Calculus I	4	MATH 200 Calculus I	4
MTH 264	Calculus II	4	MATH 201 Calculus II	4
MTH 283	Probability & Statistics	3	STAT 309	
MTH 265	Calculus III	4	MATH 307 Multivariate Calculus	3
MTH 267	Differential Equations	4	MATH 301 Differential Equations	3
MTH 266	Linear Algebra	3	MATH 310 Linear Algegra	3
PHY 241 - 242	University Physics I - II	8	PHYS 207 University Physics I and PHYS 208 University Physics II	8
CHM 111*	Chemistry I	4	CHEM 101 and CHEZ 101 General Chemistry and Lab	4
CHM 112*	Chemistry II	4	CHEM 102 and CHEZ 102 General Chemistry II and Lab	4
CHM 241	Organic Chemistry I	3	CHEM 301 Organic Chemistry I	3
CHM 245	Organic Chemistry I Lab	2	CHEZ 301 Organic Chemistry I Lab	2
CHM 242	Organic Chemistry II	3	CHEM 302 Organic Chemistry II	3
CHM 246	Organic Chemistry II Lab	2	CHEZ 302 Organic Chemistry II Lab	2
ENG 111	English Composition I	3	UNIV 111and UNIV 112	3
ENG 112	English Composition II	3	UNIV 200	3
HIS Elect	History Elective	3	Students who complete the TCC Associates of Science in Engineering fulfill all VCU Core requirements	3
Soc Sci Elect	Social Science Elective	3		3
Hum Elect	Humanities Elective	3		3
CSC 201	Computer Science I (EGR125 equivalent course)	4	CMSC-255 Intro to Computer Science	3-4
CSC 210	Programming with C++		EGRE 246 Advance Engineering Programming	3