

# Industrial & Systems, Manufacturing, Material Science and General Engineering Program Requirements

16-Apr-21

Course #	Description	TCC	TCC	UW		WSU	WWU	SPU
		AS-CE/ME	MSE/MFGE	Seattle		Pullman	Bellingham	Seattle
		MRP	MRP	ISE	MSE	MSE	MFGE	General
Math& 151, 152, 153	Calculus 1, 2, 3	R	R	√-app	√-app	G	√	G
Math& 254	Calculus 4	S	S	√-app	√-app	G		G
Math 238	Differential Equations	R	S	G - see back	√-enr	G	G	G
Math 220	Linear Algebra	R	R	G - see back	G	G	√	G
Not at TCC	Calc Based Statistics		S					
Phys& 221	Calc Based Physics 1	R	R	√-app	√-app	G	√	G
Phys& 222	Calc Based Physics 2	R	R	√-app	√-app	G	√	G
Phys& 223	Calc Based Physics 3	R	R	√-enr	G	G	G	G
Biol& 221	Intro to Evol, Ecol & Biodiv	S	S		A			
Chem& 161	General Chem 1	R	R	√-app	√-app	G	√	G
Chem& 162	General Chem 2	R	S	√-enr	A	G		A
Chem& 163	Gen Chem 3	S	S		√-app	G		
Chem& 261	Organic Chem 1		S	A	A			A
Engr& 104	Intro to Design	S or Soc <sup>1</sup>	S or Soc <sup>1</sup>	Gen	Gen	G-2	√	
Engr& 114	SolidWorks/Graphics	S or Hum <sup>1</sup>	S or Hum <sup>1</sup>	Gen	Gen or A4	G-2		G
Engr 170	Intro to Material Sci	S	R	G	√-enr	G	√	
Engr& 204	Electric Circuits	S		G - see back	A	G-2		G
Engr& 214	Statics	R	R	√-app	G	G	√	G
Engr& 215	Dynamics	R	S	√-enr 3	A4	G		A
Engr& 224	Thermodynamics	S	S	A	A4	G		G
Engr& 225	Mech of Materials	R	R	√-enr 3	G	G	G	G
Engr 240	Applied Numerical Methods	S	S	A	√-enr (or 142)	G-2	G	G (or 142)
CS 142	Java 1	S	S	G - see back	√-enr (or 240)	G-2		G (or 240)
Engl& 101	English Comp 1	R	R	√-app	√-app	G	G	A
Engl& 235	Technical Writing	S	S	G	G	G		
Hum and Soc Sci <sup>1</sup>		R	R	Gen- see back	Gen - see back	Gen- see back	Gen	Gen

**TCC Key:**

There are three relevant associate's degrees: 1) AS-CE/ME - MRP, 2) AS-MSE/MFGE- MRP, and 3) AS-T2. More info on back.

**R** = Required for the AS-MRP degree. The AS-T2 also requires completion of a minimum of 32 additional advisor-approved college level credits.

**S** = Specialization Course - Minimum of 4 courses for AS-CE/ME-MRP. Minimum of 5 courses for AS-MSE/MFGE-MRP. May also be used in the AS-T2.

**University Key:**

√ = Required for admission or certification to the department. For UW, √-app class must be completed by April 5. √-enr by Fall start at UW.

**G** = Graduation requirement for the Bachelor of Science at the university. These are freshman/sophomore level courses so take now, if possible.

**A** = Meets an additional requirement. The university requires the selection of additional classes from specific lists for the BS.

**P** = Provides preparation for junior level university coursework and/or for the FE/EIT exam, the first step to being licensed.

**Additional notes:**

<sup>1</sup> Economics is recommended. Engr& 104 counts as either a Specialization course or a Social Science, but not both. Engr& 114 may count as either Specialization course or as a Humanities, but not both. The AS degrees require 15 credits of Humanities and Social Science. At least 5 credits must be a Humanities and 5 credits must be a Social Science. One class must meet the multicultural requirement. See approved lists. Universities may have specific course Humanities/Social Science course requirements.

2. Currently, Engr& 104 is required. If WSU-MSE-proposed changes are approved by WSU, Engr& 114 will be required instead Engr& 104, and Engr& 204 will not be required. Currently, either Engr 240 or CS 142 is required. If WSU-MSE-proposed changes are approved by WSU, only CS 142 will satisfy graduation requirements.

3 For UW ISE, either Engr& 215 or 225 are required for enrollment, but both are required for graduation. 4 For UW MSE, two of three may apply.

## **Industrial, Systems, Manufacturing and Material Science and General Engineering Program Requirements**

### **Tacoma Community College**

Students should generally be working toward one of four associate's degrees: 1) the Associate of Science - Civil and Mechanical Engineering - Major Related Program (AS-CE/ME - MRP), 2) the Associate of Science - Materials Science and Manufacturing Engineering - Major Related Program (AS-MSE/MFGE- MRP), 3) the Associate of Science- Track 2 (AS-T2), and/or 4) the Associate of Arts DTA (AA-DTA). It is important to understand the distinctions. Most Industrial Engineering students should be working toward the AS-CE/ME -MRP. Most Materials Science Engineering and Manufacturing Engineering students should be working toward the AS-MSE/MFGE-MRP. The MRP degrees were developed to closely match university engineering program coursework. They require 108 or 103 credits, rather than 90, which can be helpful with financial aid. The AS-T2 is less restrictive. Students can make more self-advising errors using this model and should not use this as a degree goal; however, if you are ready to transfer and a few classes shy of the MRP degree, you might still be eligible for the AS-T2 (speak with an engineering advisor). The AA-DTA degree is intended for students to complete their general education requirements and is usually a poor fit for engineering students. Some universities give specific benefits for one or more of these degrees. Although we occasionally advise transferring without a degree, please transfer courses back to complete the degree. TCC funding is tied to associate's degree completion, so you help future students by finishing your degree. You may earn more than one degree from TCC, but must have an additional 30 credits for each degree.

### **University of Washington - Seattle**

You must apply to both the university and the major. The Industrial & Systems Engineering and Material Science & Engineering departments only admit students in fall quarter. The transfer student application deadline for the University of Washington (fall quarter start) is February 15. (There may be other deadlines for international students.) The application deadline for the departments is April 5. Some classes must be completed before you apply (V-app). Some courses must be completed before you start in the fall (V-enr). Competitive applications for ISE will have completed at least half of the (G-see back) classes. University of Washington requires core requirements from high school. This applies even if high school was years ago! High school is considered to start in 9th grade. The core requirements are 4 years of English, 3 years of math, 3 years of social science, 2 years of foreign language, 2 years of lab science, and 0.5 years of art. If you did not complete these in high school, the requirements can be met through TCC courses. In general, 1 year of high school class = 5 credits of college work. See the University of Washington website for more details.

### **Washington State University - Pullman**

Individual departments have specific requirements, so while a social science may transfer, if you don't choose carefully, you may also have to take another class to meet the requirement. Choose the following courses: HIST& 128 (World Civ 3) and ECON& 202 (Macro). Completion of the AS-T degree (WA) automatically satisfies UCORE WRTG, QUAN, BSCI, PSCI, and three of the following requirements: HUM, SSCI, ARTS, DIVR, ROOTS. Up to three additional lower-division UCORE must be satisfied via transfer credit or in-residence credit prior to completion of a baccalaureate degree, and an individual course completed within the AS-T degree may not satisfy more than one UCORE category. WSU requires a writing portfolio <https://writingprogram.wsu.edu/uwpsubmission/> WSU is on the semester system, rather than the quarter system. They require application to the university, followed by admission to major. See university website for important deadlines.

### **Western Washington University**

WWU's Manufacturing Engineering Technology (MET) program has been replaced by a Manufacturing Engineering (MFGE) program. Apply for admission to the program for spring of sophomore year (primary admission) or fall of junior year (secondary admission). Transfer earlier if you cannot complete Engr 170 before transfer. This program does not require Math 153, but that class is required at TCC for all 200 level math classes. The AS-T2 is the most appropriate associate's degree option.

### **Seattle Pacific University**

SPU is a private Christian university. The BS in Gen Engin combines ME & EE with a lot of flexibility for tailoring to student interest. Students can begin their studies at SPU at any point. If you have earned, prior to matriculation at SPU, an AS-T2 degree and junior standing, you will be required to take only two of the three required University Foundations courses, UFDN 3001 Christian Scriptures and UFDN 3100 Christian Theology. At least 15 credits of your transfer coursework in humanities and social sciences will be used to fulfill SPU's humanities and social science requirements, whether or not the courses match SPU requirements on a course by course basis. There are then two years of coursework at SPU. You will be required to complete any remaining general education requirements, demonstrate proficiency in a foreign language, and complete the "W" and cultural understanding and engagement requirements prior to graduation. The General Engineering degree at SPU is ABET accredited.

**It is the student's responsibility to check university websites and meet with university advisors to ensure the accuracy of advising information.**