

Benchmarks for teacher preparation programs to integrate engineering: Prepared by the NextGen-WA STEM Teacher Preparation Engineering Working Group

Components	Beginning	Developing	Integrating	Generating and Sustaining
Thoroughness of integrated engineering design process	Program provides opportunities for all students to produce an object, process, or system	Program provides opportunities for all students to produce <i>and evaluate</i> an object, process, or system	Program provides opportunities for all students to produce, evaluate <i>and optimize</i> an object, process, or system	Program provides opportunities for all students to <i>define their own problem</i> , produce, evaluate and optimize <i>through multiple iterations</i> an object, process, or system
Level of integrated teamwork and authentic problem-solving	Program is seeking to provide opportunities for students to experience engineering design using teamwork and authentic problem-solving	Program provides limited opportunities for students to experience engineering design using teamwork and in the context of an authentic problem	Program provides multiple opportunities for all students to experience engineering design using teamwork and in the context of an authentic problem	Program provides opportunities for all students to become fully-immersed in an authentic engineering problem
Frequency of engineering integration	Program is seeking to provide opportunity for students to learn engineering design content and pedagogy	Program provides opportunity for students to learn engineering design content or pedagogy	Program provides opportunity for students to learn engineering design content and pedagogy, and apply these in a clinical practice context	Program provides opportunity for students to learn engineering design content and pedagogy, and apply these in a clinical practice context and these are fully aligned
Level and diversity of professional engineering community engagement	Program is seeking to establish partners with working engineers	Program engages with working engineers (involved in 1 level of menu of options) more diversity of engineering experts	Program has documented partnerships with working engineers (involved in multiple levels of options) more diversity of engineering experts	Program has partnerships with working engineers; partnerships are purposeful, mutually beneficial, monitored, and evaluated
Level of K-12 partnerships in engineering	Program is seeking to establish strong K-12 partnerships for engineering	Program provides opportunity for students to experience some engineering design in a clinical practice context	Program provides opportunity for some students to experience high quality engineering in high quality student teaching experiences (as defined, for example, by the NextGen Clinical Practice working group: https://serc.carleton.edu/stemteacherprep/resources/245272.html).	Program provides opportunity for all students to experience high quality engineering in high quality student teaching experiences (as defined, for example, by the NextGen Clinical Practice working group: https://serc.carleton.edu/stemteacherprep/resources/245272.html).
Equity in engineering	Program is seeking to include diverse, equitable, place-based experiences and partnerships	Program provides opportunity for students to experience at least one culturally-relevant, place based engineering problem	Program provides opportunity for students to experience multiple culturally-relevant, place based engineering problems and learn about diverse engineers.	Program framework is designed around place-based, culturally-relevant (to the students at that school, i.e., students choose problems) engineering experiences. Students have multiple opportunities to interact with diverse engineers, including engineers who share cultural identity with the students.