

PROGRAM CRITERIA FOR MATERIALS, METALLURGICAL, CERAMICS AND SIMILARLY NAMED ENGINEERING PROGRAMS

Background

Program Criteria are a product of the technical societies and are approved by EAC and ABET. Program Criteria are limited to the areas of curricular topics and faculty qualifications. There has been long-standing issues with curricular requirements, which require that a topic is taught, being misinterpreted as student outcomes, which require periodic assessment and evaluation. (Programs may articulate additional student outcomes, but few do.) The ACERS and TMS Accreditation committees are proposing some changes that would remove any doubt about the expected treatment of the curricular requirements as well clarify some language in order to minimize the effort of programs to maintain accreditation. No change in the meaning of the program criteria is intended.

Current Curricular Section

*The curriculum must **prepare graduates to apply** advanced science (such as chemistry, biology and physics), computational techniques and engineering principles to materials systems implied by the program modifier, e.g., ceramics, metals, polymers, biomaterials, composite materials; **to integrate** the understanding of the scientific and engineering principles underlying the four major elements of the field: structure, properties, processing, and performance related to material systems appropriate to the field; **to apply and integrate** knowledge from each of the above four elements of the field using experimental, computational and statistical methods to solve materials problems including selection and design consistent with the program educational objectives.*

Issues to Consider

- **Highlighted** text can be interpreted as “outcome” in nature.
- The “appropriate to the field” in “*underlying the four major elements of the field: structure, properties, processing, and performance related to material systems appropriate to the field;*” seems unclear. Does it mean the subdiscipline from the program modifier?
- “Advanced science” is not defined anywhere, but “basic science” is addressed in the Criteria. That definition includes the parenthetical examples. Self-studies reference the basic science courses, so we should be consistent throughout.
- “Selection and design” is often thought to be selection and design of materials. Many programs emphasize processing, which should be explicitly mentioned.
- “Consistent with the program educational objectives” is unnecessary since that verbiage is already in Criterion 5 for the curriculum as a whole.
- A long list of ideas connected by semicolons is hard to follow, and designating each idea with a letter facilitates citation.

Proposed Revision of Curricular Section (Post Accreditation Committee)

The curriculum must include:

- a) coursework in materials, basic science, mathematical and statistical methods, and engineering principles implied by the program modifier, e.g., ceramics, glasses, metals, polymers, biomaterials, and composite materials.*
- b) the scientific and engineering principles underlying the four major elements of the field: structure, properties, processing, and performance related to material systems appropriate to the program modifier.*
- c) the selection and design of materials and/or processes.*
- d) application of experimental and computational methods to materials problems.*

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