DISCIPLINE DESCRIPTION

MODELING, SIMULATION, AND TRAINING

ACTIVE TEACHING DISCIPLINES

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CIP Code	Title	Definition
30.0601	Systems Science and Theory.	A program with a multidisciplinary approach to the analysis and solution of complex problems, requiring a combined approach using data and models from the natural, social, technological, behavioral and life sciences, and other specialized fields.

Note: More information on the National Center for Education Statistics (NCES) Classification of Instructional Programs (CIP) taxonomy is available at https://nces.ed.gov/ipeds/cipcode/.

The qualifications described below represent commonly accepted good practices for teaching in the discipline(s) represented in the unit.[1]

Section 1. General description of the unit, including academic programs and course offerings[2]

The School of Modeling, Simulation, and Training, home to the university's Institute for Simulation and Training, houses a series of interdisciplinary graduate degree programs in modeling and simulation, designed primarily for students with backgrounds in science, technology, engineering, and mathematics who wish to pursue careers in any number of fields, including academe, government, defense, entertainment, technology, service, and manufacturing.

Simulation is used in almost every scientific and engineering field as a technique for exploration, modeling, and analysis. It is also used in training, management, and concept exploration to evaluate the behavior of humans, organizations, equipment, and systems. Because of the scale and diversity of modeling and simulation's applications, practitioners have developed both generalized and specialized skills and bodies of knowledge.

Input from researchers and practitioners in government and industry has been instrumental in identifying key competencies for modeling and simulation professionals and has been critical to the development of the school's degree programs. The curriculum is designed to provide a broad perspective across people, processes, and technology relating to the developing simulation industry and an awareness of associated economic factors, particularly with respect to improved training methods for high-skills, high-stakes jobs. Students, therefore, are equipped with an interdisciplinary core body of knowledge on modeling approaches, human factors, computing infrastructure, and visual representation. Students also have the opportunity to focus their study and research efforts to develop more specialized skills, working alongside faculty members with expertise in such subfields as behavioral cybersecurity, computer visualization, health-care simulation, human systems, interactive simulation and intelligent systems, simulation infrastructure, simulation management, and simulation modeling and analysis. Interdisciplinarity in communication, project work, and research is strongly emphasized within the school's degree programs.

Section 2. Qualifying degree(s) for each discipline taught in the unit[3]

A terminal degree in the teaching discipline qualifies a faculty member to teach throughout the broad scope of the teaching discipline at the undergraduate and graduate levels.[4]

The doctoral degree (e.g., PhD) with a major in modeling and simulation represents the terminal degree in the discipline.

Section 3. Broadly related discipline(s) for each discipline taught in the unit

Specialization qualifies a faculty member to teach throughout the broad scope of the teaching discipline (typically five or more courses on distinct topics).

The interdisciplinary nature of the school's curriculum means that faculty preparation may be varied. The curriculum is divided into three critical bands—people, processes, and technology—with individual courses aligned with one or, at most, two of these bands. Faculty members with academic backgrounds in the disciplines listed below may be qualified to teach courses aligned with a particular band.

- **People.** Faculty members with doctoral degrees in education or psychology may be qualified to teach courses covering cognition, human factors, and human-computing interfaces that are particularly relevant in training methods that leverage modeling and simulation.
- **Processes.** Faculty members with doctoral degrees in computer science, industrial engineering, mathematics, or psychology may be qualified to teach courses covering the mathematics and research methods needed to construct models, conduct empirical research related to modeling and simulation, and analyze results.
- **Technology.** Faculty members with doctoral degrees in computer science or industrial engineering may be qualified to teach courses related to the building and use of modeling and simulation tools.

Section 4. Selectively related discipline(s) for each discipline taught in the unit

Specialization qualifies a faculty member to teach a restricted set of courses in the teaching discipline (typically four or fewer courses on distinct topics).

N/A

Section 5. Justification for use of faculty members with "other" teaching qualifications and additional information[5]

The School of Modeling, Simulation, and Training considers other teaching qualifications in conjunction with or in lieu of academic credentials on a case-by-case basis. This is acceptable in special cases in which evidence of a faculty member's exceptional industry experience, research, or other qualifications can be documented, and in which those qualifications are directly applicable to the course or courses being taught. Given the interdisciplinary nature of the program, faculty members with a terminal degree in a STEM discipline who have substantive professional experience in an appropriate field may be qualified to teach courses aligned with their area of expertise. In particular, faculty members with significant professional or scholarly experience in the defense industry often make valuable teaching contributions, according to their area of expertise.

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1. The unit chair or director, in consultation with unit faculty members, is responsible for identifying and articulating commonly accepted good practices in each of the unit's teaching disciplines and for providing appropriate justification as needed. In the case of an emerging discipline for which common collegiate practice has not yet been established, a compelling case must be made, as necessary, to substantiate the claims presented.

2. Please provide a general description of the unit's course and program offerings at the undergraduate and graduate levels (e.g., degree and certificate programs, minors, unit contributions to interdisciplinary core courses). This section may also be used to provide other pertinent information about the unit and the discipline(s) it represents (e.g., discipline accreditation, faculty research emphases).

3. For each discipline taught in the unit, please list those degrees that are regarded by the respective disciplinary community as terminal degrees in the discipline and thus qualify a faculty member to teach throughout the broad scope of that discipline at the undergraduate and graduate levels. In most fields, a terminal degree is the commonly accepted highest degree in the given field of study. In such instances, the terminal degree is usually considered to be the academic (or research) doctorate (e.g., Doctor of Philosophy). However, some academic fields have, through custom, recognized terminal degrees that are not doctorates (e.g., Master of Fine Arts). Note that terminal degrees in other disciplines may also be appropriate for teaching in the discipline, but such credentials should be listed as broadly or selectively related degrees, as appropriate.

4. A nonterminal master's degree in the teaching discipline qualifies a faculty member to teach throughout the broad scope of the teaching discipline at the undergraduate level but not at the graduate level.

5. Please use this section to provide justification that helps to make the case for special circumstances that apply to the unit, including the use of faculty members qualified to teach by "other" means. Typically, the statements provided in this section should be of a general nature and should not address specific individuals. (Justification for specific individuals is typically handled separately during the teaching certification process.) Please cite appropriate authorities as needed to justify the unit's practices (e.g., discipline accreditation guidelines, governmental regulations).

When a faculty member cannot be qualified to teach on the basis of academic credentials (i.e., degrees, coursework) alone, qualifications other than academic credentials (or combined with academic credentials) that are appropriate for teaching particular courses may be taken into consideration. Such consideration of other teaching qualifications in conjunction with or in lieu of academic credentials must be made on a case-by-case basis. These cases should be exceptional, and the evidence provided of other demonstrated competencies and achievements must be compelling. They should also show significant evidence of professional progress as related to the faculty member's teaching assignment.