



Faculty Qualifications: Discipline Description

College of Optics and Photonics

Active Teaching Disciplines

For Administrative Use Only		
CIP Code	Description	NCES Definition For more information on the NCES CIP taxonomy, see <a href="http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55">http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55</a>
14.1003	Laser and Optical Engineering	A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of optical systems, lasers and related electronic devices. Includes instruction in wave theory and mechanics, electromagnetic applications, linear and non-linear optics, photon detecting, laser beam properties, directed energy, harmonic generation, optical systems, shielding and the design and implementation of related systems and equipment.
40.0807	Optics/Optical Sciences	A program that focuses on the scientific study of light energy, including its structure, properties and behavior under different conditions. Includes instruction in wave theory, wave mechanics, electromagnetic theory, physical optics, geometric optics, quantum theory of light, photon detecting, laser theory, wall and beam properties, chaotic light, non-linear optics, harmonic generation, optical systems theory, and applications to engineering problems.

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

Please provide a general description of unit, including programs and course offerings [2]

The College of Optics and Photonics aims to be the nation’s leader in scholarship in Optics.

The college offers graduate level (MS and Ph.D.) degrees in Optics. The subject matter covered by these degrees extends to all areas of optics and photonics. This covers the generation, transmission, manipulation, detection and imaging of electromagnetic radiation in all parts of the spectrum.

Our students enter the program with diverse undergraduate backgrounds – predominantly Physics and Electrical Engineering. Because of this diverse incoming student group, we offer a comprehensive series of graduate Optics core courses, in addition to some 30 upper level courses and teaching labs. Almost all of our courses are taught by full-time tenured or tenure-track faculty. We only hire faculty members deemed to be leading scholars, or future leaders, in their fields.

**Terminal degree(s) for each discipline taught in the unit [3]**

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

Ph.D. in Optics

**Broadly related discipline(s) for each discipline taught in the department**

*Specialization qualifies a person to teach throughout the broad scope of teaching discipline (approximately five or more courses on distinct topics)*

- Ph.D. in Electrical Engineering
- Ph.D. in Physics
- Ph.D. in Engineering Physics
- PhD in Optoelectronics
- PhD in Quantum Electronics
- Ph.D. in Electrophysics
- Ph.D. in Photon Physics

**Selectively related discipline(s) for each discipline taught in the department**

*Specialization does not qualify a person to teach distinct topics throughout the broad scope of the teaching discipline but does qualify to teach a more restrictive set of courses in the discipline (approximately four or fewer courses on distinct topics)*

- Ph.D. in Mechanical Engineering
- Ph.D. in Materials Science
- Ph.D. in Chemistry
- Ph.D. in Mathematics
- Ph.D. in Ceramics
- Ph.D. in Nuclear Engineering

**Justification for use of faculty with 'other' teaching qualifications and additional faculty teaching qualifications information [5] [6]**

Degrees in Optics are not common, as this is an area of science and engineering that has only recently emerged as a separate discipline in the US. Hence most of our faculty members have Ph.D. degrees in closely related disciplines such as Physics, Electrical Engineering, etc. Some of our faculty members and joint appointments may have less strongly related degrees, such as Chemistry, Materials Science, Mathematics, etc., that may qualify them to teach only certain courses in the optics program. Irrespective of the faculty member's degree, the assignment of teaching is based on faculty expertise.

For all faculty members with related Ph.D. degrees, it is expected that a large component of their degree (usually the dissertation research) would be in the area of optics and photonics. Alternatively, a long history of experience and leadership in research fields related strongly to optics would qualify a faculty member to participate in all aspects of education in the college.

In rare cases, we may assign an adjunct who is highly qualified to teach a particular graduate course, yet does not have a terminal degree. This would only happen when we believe a course is highly valuable to our students and when our full time faculty members do not have the necessary experience to teach the particular course. In such circumstances, appropriate justification and documentation of the individual's "other demonstrated competencies and achievements" is provided.

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[1] The unit chair/director, in consultation with unit faculty, has responsibility for identifying and articulating commonly accepted good practices in each teaching discipline taught in the unit 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 provided as necessary to substantiate the claims made.

[2] Please provide a general description of the unit course and program offerings at the undergraduate and graduate levels (e.g., degree and certificate programs, minors, departmental contribution 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] List those degrees for each discipline taught in the unit 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 both 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, Master of Social Work). Note that terminal degrees from other disciplines may be appropriate for teaching in the discipline as well, but such credentials should be listed as broadly or selectively related degrees, as appropriate.

[4] A non-terminal master's degree in the teaching discipline qualifies a person to teach throughout the broad scope of the teaching discipline at the undergraduate level, 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 your unit including the use of faculty qualified to teach by 'other' qualifications and other special situations. Typically the statements provided in this section should be of a general nature, and not address specific individuals. (Justification for specific individuals is typically handled separately during the teaching certification process.) As appropriate, please cite to appropriate authorities to justify departmental practices (e.g., discipline accreditation guidelines, state regulations).

[6] When a faculty member cannot be qualified to teach on the basis of academic credentials (degree(s) and course work) alone, qualifications other than academic credentials (or combined with credentials) may be appropriate for teaching particular courses. Consideration of other teaching qualifications either in conjunction with or in lieu of academic credentials must be made on a case-by-case basis. Such cases should be exceptional and the evidence of other demonstrated competencies and achievements provided must be compelling. It should also show substantial and significant evidence of professional progress as related to the faculty member's teaching assignment.