

## Graduate Certificate in Precision Metrology




### 06. New/Revised Graduate Certificate or Post-Master's Certificate [2017-2018 Catalog]

#### Instructions

**\*\*Read before you begin\*\***

Please turn on the help text before starting this proposal by clicking on the information icon  at the top of the form.

If **creating new graduate certificate**, there are three (3) major steps

|             |   |
|-------------|---|
| 1. Complete | Complete all the required fields. All fields with an * are required. You will not be able to launch the proposal without completing required fields. Attachments may be added to the proposal at any time by using the files icon  at the top of the form. |
| 2. Launch   | Before you make any edits, LAUNCH the proposal. To launch, use the triangle icon  at the top of the form.  |
| 3. Approve  | As the originator, you have to approve the proposal to send it onto the next step. To approve, use the decisions icon  at the top of the form.   |

A graduate certificate program is a stand-alone credential that typically consists of 12-15 credit hours of graduate coursework in a focused area of study. The graduate certificate or post-master's graduate certificate may provide individuals with specialized training in a particular academic and/or occupational area, as well as augment professional skills to help advance their careers. Many of UNC Charlotte's graduate certificate programs consist of a subset of courses required for a master's degree, so they enable individuals to quickly gain admission and begin a program of study before committing to a master's degree. Credit hours earned in a certificate program may be applied to a master's or doctoral program pursued either in conjunction with or after the certificate has been awarded. Note that credits earned in a certificate program may not be used to satisfy the requirements of a second certificate program.

For academic units, certificates can be used to test the viability of possible new degrees prior to going through the formal processes to prepare and review a new degree proposal. They provide a valuable pipeline to recruit students into existing degree programs and also provide meaningful interdisciplinary opportunities. Conversely, certificates can also be discontinued at any time if no longer viable.

In general, admission requirements for the Graduate Certificate are:

A bachelor's degree, or its equivalent, from a regionally accredited college or university

GPA of at least 2.75 (based on a 4.0 scale) on all previous work completed beyond high school (secondary school).

An online application through the Graduate School's application system

A statement of purpose

Unofficial transcripts of all college course work attempted





Official and satisfactory scores on the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution

Given that certificates are not degree programs and are intended to provide streamlined educational opportunities, standardized test scores (e.g., GRE, GMAT, MAT) are not required for admission.

Additional administrative considerations for admission and completion requirements for certificates may be found in the current version of the Graduate Catalog and should be consulted when preparing a request to establish a new certificate.

**Note:** Certificate programs will be approved for a five-year period. They are reviewed for renewal every five years using the Certificate Renewal Process approved by the Graduate Council. Certificates can be modified at any time through this same procedure as new certificates, or can be ended at an earlier date at the request of the program or discretion of the Provost if they are no longer justified.

If **revising** existing graduate certificate, there are five (5) major steps

|             |   |
|-------------|---|
| 1. Import   | Answer the first two questions (originating unit and program type), then bring in the current information from the catalog. To import, use the arrow icon  at the top of the form.   |
| 2. Complete | Complete all the required fields. All fields with an * are required. You will not be able to launch the proposal without completing required fields. Attachments may be added to the proposal at any time by using the files icon  at the top of the form. |
| 3. Launch   | Before you make any edits, LAUNCH the proposal. To launch, use the triangle icon  at the top of the form.  |
| 4. Edit     | Make all proposed changes.  |
| 5. Approve  | As the originator, you have to approve the proposal to send it onto the next step. To approve, use the decisions icon  at the top of the form.   |

Some of the questions below are for new certificates only, and can be skipped if not applicable to your revised certificate proposal.


## Content

Originating  
Unit/Department/  
School/Program\*

Department of Mechanical Engineering and Engineering  
Science

Program Type\*  Program  
 Shared Core

Proposal Type\*  New Graduate Certificate  
 Revision to Existing Graduate Certificate

If revising an existing graduate certificate, then use the import icon  at top of form.

Certificate Title\* Graduate Certificate in Precision Metrology

Graduate Program Director Name Edward Morse (proposed for this certificate - Tony Schmitz is GPD for the other programs within Mechanical Engineering)

Are you the Graduate Program Director for the certificate program?\*  Yes  No

Proposal Summary –(If new certificate, include the statement that the new certificate is to be added using existing courses only.)\*

The Graduate Certificate in Precision Metrology provides graduate students and professionals with the opportunity to reach a demonstrated level of competence in dimensional metrology theory and application beyond the undergraduate level and "bench experience."

Students will be introduced to topics directly related to dimensional metrology and its application in industrial settings. These advanced course topics will, together, provide students with broader knowledge of the field of metrology and exposure to advanced techniques in dimensional measurement and analysis of data.

This new certificate is to be added using existing courses only.

**How to build a curriculum and import courses:**

### Building Programs

Use the three icons below the Curriculum title to switch between views. Always add and remove courses for the program using the View Curriculum Courses option (right-most icon). Use the Import Course button to add existing courses from the catalog. Use the Add Course button to enter the prefix, number and title of a new course that is not yet in the catalog. Switch to the View Curriculum Schema option (middle icon) to format the

requirements exactly as they should appear in the catalog. Refer to the **Catalog Style Guide** for specifics on the expected format. Use the **Preview Curriculum** option (left-most icon) to preview the full curriculum.

### Prospective Curriculum\*

## Course requirements

The certificate is awarded upon completion of four graduate level courses (12 credit hours) in the area of metrology. The cumulative GPA must be at least 3.0 and at most one course with a grade of C may be allowed toward the certificate.

Requests for related course substitutions may be approved at the discretion of the Program Director.

## Required Courses

The following courses are required for the Certificate. For students who are also enrolled in a PhD program, MEGR8181 and MEGR8182 should be substituted.

MEGR 6181 Engineering Metrology

MEGR 7182 Machine Tool Metrology

## Additional Courses

Two of the following courses must be taken as part of the Certificate program. Students also enrolled in a PhD program should take the 8000-level equivalent courses.

Allowable Special Topics courses are:

**Gear Manufacturing and Metrology**

**Introduction to Optical Fabrication and Testing**

**Data Analysis and Uncertainty**

**Flexures**

Two different Special Topics courses may be taken to fulfill the additional courses requirement

MEGR 7183 Design of Precision Machines and Instruments I

MEGR 7283 Advanced Coordinate Metrology  
 MEGR 7284 Advanced Surface Metrology  
 MEGR 7090 Special Topics

## Transfer of Credits

**If any of the above courses are taken prior to admission to the certificate program, the student may, with the recommendation of his/her advisor and the approval of the Graduate School, apply a maximum of six graduate credit hours acceptably completed toward the certificate.**

**The Classification of Instructional Programs (CIP) is a taxonomy of academic discipline. It is an accepted federal standard for program classification and serves as the mechanism by which the University of North Carolina system maintains inventory of our programs. Creation of a new major or certificate requires that the originator propose a CIP code that is appropriate based on the content of the program. Click this link to browse all CIP Codes at the [National Center for Education Statistics](#).**

**CIP Code for new certificate** 14.1901

### Admission Requirements

In addition to the general requirements for admission to the Graduate School, the ME&ES department seeks the following:

Either

- A bachelor's degree in engineering or a closely related technical or scientific field, **or**
- Undergraduate coursework that includes engineering fundamentals (e.g. solids, statics, and dynamics),

A GPA of 3.0 (out of 4.0)

Applicants should submit written description of any relevant and significant work experience, especially as it pertains to metrology

Applicants whose native language is not English, will need to satisfy the UNC Charlotte Graduate School's English proficiency requirements.

### Program Description

The certificate will be awarded upon completion of four graduate level

**(include requirements for completion of the certificate.) \***

courses (12 credit hours) in the area of precision metrology, based on the course lists below. The cumulative GPA must be at least 3.0 and at most one course with a grade of C may be allowed toward the certificate. Requests for other metrology-related course substitutions may be approved at the discretion of the program's graduate director.

The graduate certificate may act as a standalone graduate option for post-baccalaureate and post-master's students, or may be pursued concurrently with a related graduate degree program at UNC Charlotte. The 12 credit hours in the certificate may be applied toward the M.S. in Mechanical Engineering with approval of the Program Director.

**Will the certificate program be delivered on campus, 100% online, or a combination?**

A combination. Primary instruction will be face-to-face, but distance learning will be supported. The Center for Precision Metrology enjoys a national reputation; we anticipate interest from many stakeholders in courses that would be available online. The possibility of offering some of the courses in an on-line format will be investigated, including having laboratory sections combined into a single "lab week" that would be on-site.

**Need for Program: \***

UNC Charlotte's Center for Precision Metrology (CPM) is centered in the William States Lee College of Engineering and has produced many (over 200) successful graduate students earning MS and PhD degrees in Mechanical Engineering, as well as Physics and Optical Sciences.

Metrology (the science of measurement) is a mature field, but one whose importance is often not understood by practicing engineers until they have a few years of experience. Once an engineer reaches the realization that metrology is an important field and one in which he or she wishes to gain additional knowledge, there are almost no opportunities for this, other than enrolling in a full-time graduate degree program at UNC Charlotte.

This certificate proposal seeks to alleviate this problem, by offering the opportunity to attain additional knowledge on a part-time basis.

**Impact Statement Part A. What group of students would be served by this certificate?**

Two primary groups will be served by this certificate program. The first group consists of practicing engineers, working in industry or laboratories, who wish to augment their knowledge and proficiency in the field of metrology without enrolling in a full-time masters degree program. The second group is made up of graduate students studying metrology who wish to have some specific recognition of their competence.

**Impact Statement Part B. What impact will this certificate have on existing curricula?** As the proposed courses needed for this certificate are already being taught on a regular basis, there should be a minimal impact on the department in terms of providing the courses to additional students.

**Impact Statement Part C. What is the projected annual enrollment for the first five years? Include "new" student enrollment counts and indicate if the program will primarily be pursued by students who are concurrently enrolled in a master's program or only enrolled in the certificate program.** The proposed certificate program is expected to have positive impact on the overall graduate enrollment in the College of Engineering and the Department of Mechanical Engineering and Engineering Science. These additional students will often have the support of their employer, as they will be working toward a certificate. As these students will come from local industry, their presence on our campus will increase the College's visibility to local employers.

Anticipated annual enrollment over the first 5 years:  
 + 12 or more per year from current graduate students  
 + 2 to 6 per year from industry (only enrolled in certificate)

**Impact Statement Part D. Are any new resources required to implement the certificate? If "yes" what are they and how will these needs be met?** All courses for the certificate are already taught on a regular basis.

**Will a tuition increment be charged for this certificate? If "yes", how much?** Yes, the standard College of Engineering increment.

**How will the certificate be evaluated?**

The success of this graduate certificate program will be evaluated based on enrollment and completion rates, both in absolute numbers and year-over-year growth.

**Requested  
Effective Term:** \*

**Other**

**If "Other",  
indicate term:** Spring 2017

**If "Other",  
explain reason:** This certificate relies on existing courses only, and there has been some urgency from industry for us to meet this need (see supporting letters in attached file).

Dr. Chris Evans is piloting distance learning in his "Surface Metrology" course this semester in response to additional interest from a national laboratory (NIST).

## Consultations and Documentation

### Attachments needed:

**Letters of support or consultation as required. All units sponsoring and participating in the certificate should approve the proposal and provide letters of support.**

**Student Learning Outcomes. Provide SLOs in [template format](#).**

**Check boxes  
when you have  
attached:** \*

- Letters of support and consultation
- Student Learning Outcomes

**Note: For an educational program to be eligible for Title IV federal financial aid (unsubsidized student loans), it must lead to a degree, prepare students for further study, or lead to gainful employment. Because certificate programs do not necessarily lead to a degree, the U.S. Department of Education requires institutions to disclose certain**



**information about the programs. If the proposed certificate is approved, it will be subject to annual Gainful Employment approval, disclosure, and most likely reporting requirements as established by the U.S. Department of Education.**