



# UNC CHARLOTTE

## Department of Mechanical Engineering and Engineering Science PROPOSAL FOR GRADUATE CERTIFICATE

To: Engineering Graduate Committee Chair

From: Dr. Edward Morse (Professor of ME&ES and Deputy Director, Center for Precision Metrology)

Date: June 21, 2016

Re: Establishment of Graduate Certificate: Graduate Certificate in Precision Metrology

The following documentation is provided for the proposal of a graduate certificate following the published procedure: <http://provost.uncc.edu/sites/provost.uncc.edu/files/media/Graduate-Certificate-Proposal-Procedures.pdf>

### Procedure for Certificate Program Approval:

Approval by the appropriate college committees and deans and the Graduate Council are forwarded to the Dean of the Graduate School (DGS). The DGS, having determined that all appropriate consultations have been conducted and that the home college has approved the proposal in wording consistent with that approved by the Graduate Council, forwards the recommendation to the Provost.

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
				<u>DEPARTMENT CHAIR</u> Dr. Scott Smith
				<u>COLLEGE GRADUATE CURRICULUM COMMITTEE CHAIR</u>
				<u>COLLEGE FACULTY CHAIR (if applicable)</u>
				<u>COLLEGE DEAN</u> Dr. Robert Johnson
				<u>GRADUATE COUNCIL</u>

**UNC CHARLOTTE**  
**Department of Mechanical Engineering and Engineering Science**  
**PROPOSAL FOR GRADUATE CERTIFICATE**

Proposal Format (No New Courses Required or Proposed)

**I. TITLE: Graduate Certificate in Precision Metrology**

A. Summary/Catalog Copy

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.

B. Program Requirements

The certificate will be awarded upon completion of four graduate level 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.

Required courses (2):

- MEGR 6181 – Engineering Metrology
- MEGR 7182 – Machine Tool Metrology

Optional courses (any 2):

- MEGR 7283 – Advanced Coordinate Metrology
- MEGR 7284 – Advanced Surface Metrology
- MEGR 7090 – Gear Manufacturing and Metrology
- MEGR 7090 – Introduction to Optical Fabrication and Testing
- MEGR 7090 – Data Analysis and Uncertainty
- MEGR 7183 – Precision Machine Design
- MEGR 7090 – Flexures

C. 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), calculus, and statistics
- A GPA of 3.0 (out of 4.0)

## Short Form – Graduate certificate in Precision Metrology

- 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.
- 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.

### D. Justification

#### *1. 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.

#### *2. Impact Statement (To include how the program affects the department's graduate program, any interdisciplinary programs (if applicable), and the Charlotte region.*

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.

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. As 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.

### E. Letters of support and consultation.

Please see the Appendix for letters of support from Siemens, Corning, QVI, Caterpillar, and Cummins.

Short Form – Graduate certificate in Precision Metrology

F. UNC General Administration Inventory Information

- CIP code: 14.1901 (per Ron Smelser)
- Program title and description: ..... Graduate Certificate Precision Metrology
- Required credit hours: ..... 12 credit hours
- Program type and level: ..... Graduate Certificate
- Date of initiation: ..... August 2016
- Mode of delivery: ..... Face-to-face (primary), with possible online components
- Site (indicate “Internet” if program is online): ..... UNC Charlotte
- County (indicate “Statewide” if program is online): ..... Mecklenburg
- Whether program is on-campus or distance education: .. On-campus