

Senior Design Project Description

Company Name	UNC Charlotte Center for Precision Metrology	Date Submitted	May 25, 2017
Project Title	Probe Setting for Moore UMM 100 (CPM_PROBE)	Planned Semester	Fall 2017

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	1
Computer		Systems	
Other ()			

Project Overview:

First CPM Affiliates funded senior design (2015/160: thermal control of structural loop to +/- 0.1C of 4-axis CNC "measuring machine" (X, Z, B, C): 200 x 200 mm (XZ) with 1 nm resolution. B & C rotary axes with 1.2 arc-sec resolution.

Initial Project Requirements:

Application: measuring form error in freeform optics in 2 measurement modes:

- XZ profiles at C axis increments tied together with C(0-360) profiles
- DR profiles using B-axis with C(0-360) profiles

Suite of probes in-house:

- Two optical (Philtec triangulation, Stihl Confocal); and
- Two contact, C-LVDT, Air bearing LVDT

Expected Deliverables/Results:

SD project :

- Design/build/ calibrate/test set of artifacts for "probe setting", including fixtures and use procedures
- Radius masters for $-200 < R < 2000$ mm for B-axis measurements
- Artifacts and test methods to establish slope sensitivity for Philtec and Stihl
- In-situ probe verification using Moore Z-axis



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- Materials affects with Philtec
- In-situ probe verification using Moore Z-axis

Disposition of Deliverables at the End of the Project:

Deliver to CPM lab

List here any specific skills, requirements, knowledge needed or suggested (If none please state none):

- Labview interfacing and programming including parameter extraction from a specified sequence.
- Mechanical design and simulation
- Manufacturing of components
- Optical assessment for Philtec and Stil probes (Multicolor optical ray analysis)