

RESEARCH EXPERIENCES FOR TEACHERS
 Enhancing knowledges and skills in modern manufacturing
 18 May 2018

Project #1: Traditional Manufacturing – 12 teachers

- Focus: 2-weeks on fundamentals of Traditional manufacturing processes, Materials, Metrology
- Lab training: Participants will learn the safety rules, basic metrology, machining principles; then practice with manual saw, mill, drill, lathe, grinder to produce and assemble a set of parts within tolerances. In the second week, the participants will learn to use computer aided design (CAD) and computer aided manufacturing (CAM) software. They will model the same parts that were fabricated manually, and then generate the corresponding codes to fabricate the parts again on computer numerical controlled (CNC) lathe and milling machines.
- Authentic research experience: Participating teachers will gain basic manufacturing skills and safety knowledge before completing advanced manufacturing projects.
- Equipment: *Fabrication*: Manual lathe, saw, drill, mill, CNC lathe, CNC mill, CAM software; *Metrology*: Calipers, micrometer, height gage, go/no-go gage, measuring microscope, surface profilometer, optical profile projector, coordinate measuring machine.
- Expected outcomes: Experience with metrology techniques using basic hand tools and sorting technique; Know the safety rules in machining laboratory, and principle of machining operations. Obtain hands-on experience with manual and automatic machines

Date	Topic	Lab
Mon Jun 11	– Orientation: introduction, program overview and expectations, business matter, accommodation, parking, resources /support, lab safety, guest wifi, clicker, research, curriculum integration ... [Wayne] – Campus tour [April, Trisha] – Lec 1: Technical sketching [Mathew]	
Tue Jun 12	Lec 1: cont. Project assignment [Mathew]	Exercise: Sketch of penholder and penbase.
Wed Jun 13	Lec 2: Metrology [Mathew]	Lab Metro: 2-5pm @112A Thompson
Thu Jun 14	Lec 2: cont [Mathew] Lec 3: Engineering materials [Mathew]	Lab Metro 2-5 pm (cont)
Fri Jun 15	Traditional machining	Lab Mach1: 8-12am, 1-5pm @112 Thompson
Mon Jun 18	Lec4: Traditional machining [Mathew]	
Tue Jun 19	Lec 5: Computer-aided Drafting [Jared]	CAD homework: design pen holder, penbase
Wed Jun 20	Lec 6: Computer-aided Machining [Jared]	CAD homework: design alternative pen holder
Thu Jun 21	Lec 7: Finishing processes [Wayne]	Lab Mach2: 1-5 pm, CNC @114 Thompson
Fri Jun 22	Lec 8: Multi-axis machining, laser, wire EDM [Wayne] Project presentation	Lab Mach3 3-5 pm (cont)