

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Design of an Experimental Contemporary Physics Course which Develops the Full Experience of Scientific Research and Highlights Current Faculty Research JAN M. YARRISON-RICE, HERBERT JAEGER, KHALID F. EID, Physics Department, Miami University, Oxford, OH 45056 — From background literature searches and reading, to conducting experiments, to presenting results and writing a journal manuscript, Miami University has revised its second-year Experimental Contemporary Physics Course, Phy293, to follow a basic research model. We examined research that faculty were conducting and chose experiments which were strongly related to understanding the ongoing research in the Department, while being based in fundamental quantum mechanics and recent 21st century physics. Experiments often had common instrumentation and data analysis techniques which allowed for grouping them into 3 basic categories: 1) Spectroscopy of gases and solids, 2) Characterization of contemporary samples, and 3) Quantized systems in electronic, magnetic and nuclear physics. These experiments also supported our secondary goal of preparing students to enter our research laboratories. At Miami, we generally have between 25-35 second year students, so the laboratory course must be managed to maintain groups of 2-3 for the best student learning outcomes. We will report on course logistics, the grouping of experiments, and methods for assessing students' learning. Having run the revised, full experimental format of Phy293 a 3rd time, we feel confident stating that this course demonstrates to students "how physics research in the 21st century is actually conducted!"

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Date submitted: 18 Nov 2012

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