Fall 2015

Physics Discipline Assessment Report 2015

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Physics Discipline Assessment Report

The physics discipline underwent a program review in 2011. This review included a survey of physics alumni. The alumni indicated the most useful skills in their respective professional environments. As a result of this survey and our self assessment, we adjusted our curriculum in three ways – several two credit upper division courses were developed to provide a broader background for our majors, our Senior Thesis course was expanded from one to two credits to more accurately match the workload and to increase the discipline based writing and speaking expectations for our majors, and computation and modelling opportunities were increased.

We have developed three new, two credit, upper division courses and changed one course from four to two credits. Our intent was to increase the range of physics topics available to our students without any increase in resources. The courses are Phys 3151 Solid State Physics, Phys 3152 Particle and Nuclear Physics, and Phys 3153 Cosmology. Phys 3003 Computer Modelling of Materials was re-instituted as a two credit course to maintain a computationally based upper division course. These recently instituted courses have only been taught one time and their effect on our students' physics education cannot yet be accurately assessed. Initial, informal assessment is that students value the opportunity to study various topics in physics even if the depth of the study is limited.

In order to address student workload concerns and expand discipline based speaking and writing Phys 4901 Senior Thesis was changed from one credit to Phys 4901 Senior Thesis I and Phys 4902 Senior Thesis II. Each of these courses is worth one credit. The 2015-2016 is the first year in which this new model of Senior Thesis has been in effect.

With regard to computing and modeling Phys3 003 Computational Modeling of Materials was offered by Dr. Boyd in the fall of 2014 and directly taught programming (Fortran), along with computer modeling and navigation of a supercomputing environment. Dr. Boyd has also incorporated computational components in Phys 3101 Classical Mechanics, Phys 3151 Solid State Physics, and Phys 2301 Atmospheric Physics using Mathematica, Matlab (by student choice) or Fortran (student choice). Dr. Matson used computational methods in Phys 2401 Optics and extensively in Phys 3401Experimental Physics. Dr. McIntosh uses several computer interfaced experiments with computational analysis and display in Phys 2102 Modern Physics. Dr. Korth oversees the computers in the General Physics lab updating hardware, software, and the lab manual.

Dr. Boyd's research students have contributed significantly to projects while developing programming and computational skills in C++ and Mathematica. Dr. Matson's recent research program has been largely computational. Several students worked with him using ComSol, a package of computer programs dealing with fluid mechanics. Students working on research with Dr. Korth have learned to modify and execute Fortran programs that compute multi-particle correlations in hard-sphere fluids. Dr. McIntosh's students used existing programs in Matlab to examine the statistical properties of radio astronomical sources.