INTEGRATED SCIENCE AND TECHNOLOGY (ISAT)

592. Research and Development in Industrial Technology. Credit 3 hours. Prerequisites: An overall “B” average or recommendation by the faculty and approval of the Department Head. A course devoted to research and development through laboratory experimentation of selected problems of specific interest. Course may be repeated for a total of six hours with no more than three hours in any one semester.

600. Applied Science Seminar I. Credit 3 hours. Students in the program will be expected to take the two three-credit hour applied science seminars during their first two semesters in the program. The purpose of these seminars is to develop the student’s research skills in an applied setting and to show students how interdisciplinary study will benefit their career aspirations. Students will be expected to examine the effects and applications of emerging technology in industry. Problem solving models and techniques will be illustrated and applied. Sharing of professional knowledge and expertise is expected in the flow of classroom interaction. Guest speakers from regional businesses and industries will be an integral part of these seminars.

601. Applied Science Seminar II. Credit 3 hours. Prerequisite: Completion of ISAT 600. This seminar is a continuation of ISAT 600. The course is intended to further develop the students research skills through projects involving current technology. The course will continue to present students with a broad range of current industrial practices. It will also assist students in selecting their team-based project.

610. Technological Internship. Credit 1-6 hours each semester with 6 hours needed for graduation. Prerequisites: ISAT 600, 601, 9 hours of lower level core courses and permission of the ISAT coordinator. This course is a cooperative venture between Southeastern Louisiana University and a variety of business, industry, governmental, or educational institutions. It combines the student’s academic and technical preparation at the University with actual on-the-job experiences. Grades assigned on a Pass/Fail basis only.

770. Thesis. Credit 1-6 hours each semester with 6 hours needed for graduation. Prerequisites: ISAT 600, 601 and approval of Program Coordinator. The thesis will investigate a significant interdisciplinary topic centered in the area of the student’s concentration. The results must provide a significant contribution to the knowledge base in the discipline. The thesis is graded Pass/Fail. The student must enroll in the thesis course each semester that the thesis is in progress.

771. Research Project. Credit 1-6 hours each semester with 6 hours needed for graduation. Prerequisites: ISAT 600, 601 and approval of Program Coordinator. Students will design and implement a research project. Research projects will investigate a significant interdisciplinary, applications-oriented topic centered in the area of the student’s concentration. The research project is graded Pass/Fail. The student must enroll in the research project course each semester that the research is in progress.

677. Ab Initio Quantum Chemistry. Credit 3 hours. Prerequisites: PHYS 351 or CHEM 395 or permission of the Dean. A course on numerical methods for solving the electronic Schroedinger equation. Topics include self-consistent field methods for molecular orbitals, discretization of partial differential equations using Gaussian basis sets, semi-empirical molecular orbital methods, methods for going beyond self-consistent fields.
density functional methods and many-body theory. Students will write programs to compute semi-empirical molecular orbitals.

678. Computational Optimization. Credit 3 hours. Prerequisites: MATH 312, MATH 350, and MATH 360. This is a course on continuous and discrete optimization. Several standard optimization problems along with their numerical and idea solutions will be discussed. Possible topics include unconstrained optimization using vector calculus, Lagrange multipliers, Kuhn-Tucker conditions, Conjugate Gradient Methods, Hilbert space methods in optimization, Linear Programming (simple and interior point methods), quadratic programming shortest path problems, minimal spanning trees, and stochastic optimization.