Technology has changed the ways in which we teach mathematics courses. For example, instructors can use a “behind the scenes” approach to convey key theoretical concepts and to strengthen the students’ understanding of the connection between a solution and its meaning in relation to an applied problem. In addition, technology can be used by students to gain a better understanding of the subject matter. This presentation focuses on the computer laboratory assignments that take place in the Advanced Mathematics Computer Laboratory at Georgia Southern University by students in our upper level undergraduate mathematics courses (i.e., courses beyond the first year of calculus). Experimental problems in which students are asked to make conjectures and applications projects in which students explore solutions to “real-world” problems will be on display. Sample assignments from topics such as multivariable calculus, differential equations, linear algebra, and applied mathematics will be included in the presentation.