Engineering Design and Graphics 100 (ED&G 100) is a project-based introduction to engineering design course for all freshman baccalaureate engineering students at the Altoona College of the Pennsylvania State University. In this three credit-hour course, an engineering approach to problem solving is taught with an emphasis on team work, communication, creativity, ingenuity, and computer-aided design tools. Upon completion of this three credit-hour course, students should be able to:

- Use computer software packages to assist and document the design procedure.
- Communicate effectively through oral and written presentations.
- Demonstrate basic lab work skills such as data collection, report writing, and teamwork.
- Carry out the design process from problem statement to final design.

ED&G 100 consists of three components with each component meeting for a single two-hour period once every week. This gives a total class meeting time of six hours per week for fifteen weeks. The first component of ED&G 100 introduces students to computer application skills using CAD. It also develops student design competencies in the topical area of communication. Topics covered include internet navigation, website design, word processing, MS Power Point presentations, and computer aided design and drafting using AutoCAD.

The second component of the course deals with manual graphic and drafting skills. Students are introduced to the fundamentals of orthographic projection. The topics covered include multi-view projection, dimensioning, lettering, oblique and isometric projection, sectional views, tolerances, scales, and selected topics in descriptive geometry.

The third component of ED&G 100 focuses on team-based engineering design. Several mini-projects have been developed to teach the design component of ED&G 100. These mini-projects are designed to introduce students to the basic concepts of electrical and electro-mechanical engineering. The focus of most of the mini-projects is digital electronics. Topical areas taught in digital electronics include combinational logic circuits, minimization of logic functions, and digital system design. Completion of a team-based major design project is an essential requirement. The major design project allows students to pull together previously learned concepts to design, build, and test a digital system in order to control a material handling process. In addition, there are several team presentations, lectures, exercises, and case studies presented throughout the semester.

This paper presents a detailed description of the design component of ED&G 100 course taught at the Altoona College of the Pennsylvania State University. The paper also provides a description of the assessment tools used to measure the effectiveness of the approach used to teach the design component of ED&G 100.