Paul D. Olson* (pdo2@psu.edu). *Introducing Laplace Transforms early in an applied Differential Equations course.

A course in ordinary differential equations is usually recommended after a student successfully completes Calculus II (a course which includes partial fractions for integration, series representations, and improper integrals). In working with second order, linear ode’s with integer coefficients, the students learn about the characteristic equation and how its roots help generate the homogeneous solution to the equation. For nonhomogeneous equations, we study the method of undetermined coefficients or the method of variation of parameters to help generate the general solution. Our applied differential equations course is designed for engineering technology majors or plastics technology majors. An important goal is to have the students gain experience with solving equations using Laplace Transforms. By introducing Laplace Transforms early, the students have a longer time to master those techniques. The subject shows the use of improper integrals and partial fractions. The students feel that knowing the Laplace Transform method strengthens their understanding of the classical methods of solutions. Applied mathematics can be a bridge to pure mathematics. Careful considerations of course content can be inventive and useful. (Received September 22, 2015)