Using Matlab in Applied Math Courses

Drawing from my own experience in academia and also those of my former students who are able to enter the industry, computational skill is one of the most useful skill to learn early on in our academic career. My first exposure to numerical computing was in graduate school where I took the Numerical Analysis sequence. This math course was also cross-listed as engineering and computer science course, and we were expected to be able to code algorithms in Matlab or Fortran right off the bat. This was tough at first as all the applied math courses I took as an undergraduate did not incorporate programming into the curriculum. However, it soon became obvious to me that by having programming embedded in the curriculum, the instructors could easily cover complex real-world applications that can only be solved using computers. This is something that would be missing if the course is lacking computing component.

In my institution, students who are taking introductory applied math courses, such as Numerical Analysis or Modeling, often have different expectations. While some have already expected that some assignments will involve programming, many others were anxious about it and hope that the class would be coding free. Negative experience in the prerequisite programming course might contribute to this anxiety. Some students feel that programming is challenging, difficult to learn, and often times frustrating. Some took a programming course a while back, did not enjoy it at all, or did not remember much of it.

In today's world, computing component is essential in every applied math courses. While students come from various programming background using different programming languages, it is more practical to use a single computing language throughout the course. Matlab is probably the ideal language or tool for students to learn. It is user-friendly and has rather similar syntax and structure as other languages such as Python and C++. In order to get students up to speed with Matlab, I set aside one or two class meetings to walk them through the basics and give them hands-on exercises in Matlab. Although these hands-on workshop greatly help students get started in using Matlab for their homework and class project, it takes away class times that would otherwise be used to cover the course materials.

In this workshop, I am looking forward to discussions about recommended practices to quickly introduce students to Matlab and incorporate Matlab into the applied math courses.