# Use of Computers in Undergraduate Process Dynamics, Modeling and Process Control

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1.  Use of computers in undergraduate "Process Dynamics, modeling and process control" course of Professor Dilhan M. Kalyon at Stevens Institute of Technology:  Prof. Kalyon has modified the course content and format considerably to integrate various computational tools:

    a)  The use of Matlab: All students are required to have access to Matlab and to be familiar with the Simulink facility of Matlab. During the lectures a laptop and a data projector are used to solve and present the results of every example covered in the lectures. This is an important capability and increases the pedagogical value of the lectures considerably since most of the questions of the students can be answered with new computations carried out. For example, given a process with known dynamics the effects of the tuning parameters on the stability and the performance of the system can be immediately  elucidated.  The students are also required to solve the homework problems with Matlab. A term paper which focuses on a realistic industrial application of process control to a crystallization process is also solved by the undergraduate students with Simulink/Matlab.

    b)  The use of WebCT: The Web is used extensively to post the calendar, homework and the two term paper assignments, the solutions of all the homeworks and the examinations and to post all of the presentations of the students. All of the homeworks and term papers are submitted through WebCT and the grades and comments are returned to individual students throughout the WebCT environment.

    c)  The use of word processing and presentation software: The undergraduate students are given one term paper which incorporates different tasks for each student. Each student prepares a presentation in Power Point and e-mails it for approval for presentation and comments. A data projector and a laptop computer are used for the students to make their presentations in

class. The rigid requirements of the presentation and the use of PPT has significantly improved the quality of the presentations. All of the home works and term papers are submitted electronically thus, the students use WORD and its associated equation editor and drawing tools, preparing them better for the work place.

2. Computational Facilities: Prof. Kalyon has improved the computational capabilities of his research group by procuring and installing a Silicon Graphics 2200 server with two parallel processors and 4 GB of RAM. A subnetwork was also established to link all of the PC, Unix, and Mac computers to the server to allow routine backup of all of the work of the students and postdoctorals at three levels. In a short while the hard disks will be removed from the individual computers to facilitate better archiving and backup of computational research carried out.

3. Computational Ph.D thesis: Prof. Kalyon's student Mel Allende has submitted his thesis entitled" Shear induced Particle Migration in Suspensions of Non-colloidal Particles" which incorporates finite difference method based solutions of the particle flux expressions of Acrivos and co-workers for various geometries and particle sizes.