**Week 12 (Apr 15 – 19, Lectures 23 and 24) Teaching and Learning**

**Topics**

**16.3**: Path independence of line integrals; conservative fields; fundamental theorem of line integrals; gradient fields; the loop property; component test (on open simply connected domains); finding potential functions for conservative fields; exact differential forms.

**16.4**: Green’s theorem and its applications for finding line integrals. (This part need not be finished in this week.)

**16.5**: Parametric surfaces; surface areas. (The book covers three sets of formulae corresponding to three surface forms: parametric, explicit z=f(x,y), and implicit F(x,y,z)=0; the **implicit form formulae are optional** for our course --- we do not require our students to remember them, and feel free to skip.)(We may not have time to finish 16.5 this week; can continue next week.)

(It is OK to go a bit faster than this; but aim not to be slower.)

**Assignment 12**

16.3, #2,6,10,17,20,30,33,34

16.4, #8,9,19,23,26,27,30,37,38

16.5 ,#6,7,18,23,31(b),40

The questions above need to be submitted; students are encouraged to attempt other questions in the same chapters if they need more exercises.

Deadline: 11:59 PM, Friday, Apr 26 --- solutions should be submitted online on Blackboard in one single PDF file.

**Quiz 4 next week (Week 13, Apr 22 – 26, in tutorials)**

Scope = Chapter 15 (except 15.6); three problems (could have parts); 30 minutes.