

STAT 5574
Response Surface Design and Analysis I
Fall 2009

Instructor:	Geoff Vining	Supplemental Text:
Office:	415D Hutcheson	R.H. Myers and D.C. Montgomery.
Email:	vining@vt.edu	<i>Response Surface Methodology</i> , 2 nd ed.,
Web Page:	www.stat.vt.edu/~vining	John Wiley and Sons.
Office Hours:	Mondays (when in town), Tuesdays, Wednesdays, and Thursdays 11:0 – 12:00	

Purpose

Response surface methodology (RSM) is a sequential approach to experimentation, usually with an emphasis on product or process optimization. RSM's origins are in the chemical process industry in the 1950s and 1960s. Since that time, RSM has found important applications in many other industries. RSM is vital to the practice of industrial statistics.

Course Topics

“Review” of 2^k and 2^{k-p} Designs	Product/Process Optimization
Steepest Ascent	Split-Plot Experiments
Second-Order Experiments	Mixture Experiments
“Optimal” Designs	Robust Parameter Design

Grades

The final grades will be based upon the following:

Class Participation	10%
Group Project I (Distillation Column)	30%
Group Project II (Split-Plot, Helicopter)	30%
Individual Project	30%

The individual project is due Friday, December 11 at noon.

The Virginia Tech Honor Code is in force for all homework sets and examinations. Violators will be taken to the Virginia Tech Honor System.

Grading Scale

“Standard” 60 – 70 – 80 – 90 scale.

Software

Minitab, SAS, SAS-JMP, and R (The course will require some programming when we get to split-plots).

Tentative Course Timetable

Topic	No. of Lectures
Introduction to RSM	1
Review of 2^k and 2^{k-p} Designs	6
Steepest Ascent	2
Second-Order Designs	3
“Optimal” Designs	3
Product/Process Optimization	3
Split-Plot Experiments	3
Mixture Experiments	4
Robust Parameter Design	2

No classes on the following dates: 8/27, 9/22, 9/23, 10/8, 10/27, and 10/29

We will need to find a time for make-up lectures.

First Assignment:

Read the following two papers. For each paper write an approximately two page discussion paper. These papers first should summarize the papers' main points. You then should present your reactions. **We will discuss these papers in class on Thursday, 9/3/2009.**

Hoadley, A.B. and Kettenring, J.R. (1990) “Communications Between Statisticians and Engineers/Physical Scientists,” *Technometrics*, 32, 243-274 (with discussion).

Coleman, D.E. and Montgomery, D.C. (1993) “A Systematic Approach to Planning for a Designed Industrial Experiment,” *Technometrics*, 35, 1-27 (with discussion).