

Course: **MinE 624 – Numerical Analysis for Mineral Engineering**

Semester: Fall 2007

Course Format
and Credit hours: 3 hr lecture
3 credit-hour

Prerequisites: Graduate Standing or Consent

Instructor: Dr. Felicia F. Peng
Room 359F Mineral Resources Bldg.
293-7680 ext. 3308 ffpeng@mail.wvu.edu

Schedule: Monday, Wednesday, Friday 4:00 p.m. - 4:50 p.m.

Location: Room 105 Mineral Resources Bldg.

Office Hours: Open door policy or by appointment

Course objectives: To provide the specific sets of useful mathematical, statistical, and numerical analysis methods for the students together with their knowledge in mineral engineering, to be able to conduct scientific and statistic sound data analysis and adjustment, and to create models and simulate various processes and situation in metallurgical and mineral processing engineering.

Expected Learning
Outcomes:

Upon successful completion of this course:

1. Students will have the knowledge to apply the useful mathematical tools such as scale and transformation, log function, Rosin-Rammler distribution and spline functions in mineral engineering.
2. Students will have the knowledge to use Secant method of solving a transcendental equations in metallurgical and mineral engineering problems.
3. Students will have the knowledge of using least square methods in data adjustment, mass balances and model building for metallurgical and mineral engineering problems.
4. Students will have the knowledge of mathematical and statistical methods and applying in modeling of metallurgical and mineral processing engineering problems.
5. Students will gain the skills for application of data adjustment and mass balances involved in multi-stream processes in metallurgical and mineral processing engineering.

Required Text: Peng, F. F., Notes for Applications of Numerical Analysis Methods in Mineral Engineering, Next Print, Morgantown, WV

Reference Texts: Berk, K. N., and Carey, P., *Data Analysis*, Duxbury, 2004, 587 pp.
Nandy, N., *Practical Numerical Analysis*, Alpha Science Intl Ltd, 2004, 258 pp.
Rice, A. J., *Mathematical Statistics and Data Analysis*, Duxbury,

Grading: Homework and Quizzes 60%
Assigned projects 40%

Grading Assignment:

90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
< 60	F

Notes:

- The instructor reserves the right to decrease or increase the cut-off point between any two grades.
- No homework, no grade.
- Late homework or assigned project report will be accepted with a penalty of 20% per day.

Attendance Policy:

- Attendance is absolute necessary. Absence from class more than three times will be asked to drop the class.
- No make-up quizzes except by prior arrangement with instructor, according to WVU Guidelines. The highest score for a make-up quiz will be reduced to 70%.

Social Justice Statement:

"West Virginia University committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration."

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangement with Disability Service (293-6700)".

Days of Special Concern:

WVU recognizes the diversity of its students and the needs of those who wish to be absent from class to participate in Days of Special Concern, which are listed in the Schedule of Courses. Students should notify their instructors by the end of the second week of classes or prior to the first Day of Special Concern, whichever is earlier, regarding Day of Special Concern observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of observing a Day of Special Concern.

Course Schedule:

Week	Topic
1--2	Useful mathematical tools – Scale and transformation; normal function. Log function, Rosin-Rammler distribution and spline function. Application problems.
3--4	Secant method of solving a transcendental equation. Applied problems.
5--7	Least square methods in model building and data adjustment. Application problems.
8--10	Mathematical statistics methods and modeling. Application problems.
11--12	Least squares method and mass balance techniques. Application problems.
13--15	Mass balance problems involved in multi-streams processes in mineral engineering