Data Analysis in Geophysics
ESCI 7205

Bob Smalley
Room 103 in 3892 (long building), x-4929

Tu/Th - 13:00-14:30
CERI MAC (or STUDENT) LAB

Lab – 1, 08/27/13

Assisted by

Blaine Bockholt

x-

Office – SW corner house 2.

Also assisted by

Any senior graduate student you can find to help you.

Course Description – I

- MAC
- MATLAB®
- Seismic Analysis Code (SAC)
- UNIX
- Generic Mapping Tool (GMT)
- GIS

Course Description – II

- HPC, Visualization Center
  - Writing MATLAB® GUIs
- Basics of Shell Scripting (sh, bash, csh)
  - AWK/nawk/gawk
  - FTP, SSH, X display, VNC
- Other common programming languages (Fortran, C, ?)
  - Web Page/HTML - SeaMonkey

References

See the course web page and use your favorite web search engine.

MATLAB®

- Getting started with Matlab (pdf)

References

UNIX

Unix, Visual Quickstart Guide, 4th addition
Ray and Ray, 2009.

(Text: available online at http://proquest.safaribooksonline.com/home for free from U. Memphis network)

- Awk articles online
  - (the original Awk book - http://cm.bell-labs.com/cm/cs/awkbook/)

References

Geophysics/Seismology tools (under UNIX)

- GMT Manual (html, pdf)
- SAC Manual (html, pdf)

Grading

- 70% homework assignments
- homeworks for each section of the class.
- Mathematically oriented homework assignments will use MATLAB®

(no homework on C & Fortran programming).

- Each assignment will be passed out 1-2 weeks before it is due and should be worked on throughout the given time period.
- There will be small homework assignments with each class.

- 10 % Attendance and participation

Grading

- 20% Final Project

Each student will design, implement, and present a small scale programming project.

The project should utilize multiple programs and / or techniques discussed in the class. Use of SAC and/or MATLAB®, and/or GMT, as part of the project is mandatory.

A project related to the student's own research is encouraged.

Topic should be decided on and approved no later than Tue., Nov. 3rd.

Presentation of results (20 mins./Powerpoint) will take place in lieu of a final exam on the last day of class - Dec., 8th.

The project should be thoroughly documented and all scripts/programs/ macros will be turned in as part of the final grade.

Class Format

- Class will meet in the MAC/Student Computer Lab in the long/new building.

- Class will be "laboratory" based

  - Minimum lecture

  - Hands on programming exercises

Class Format

- Class presentations will be available in pdf format after class on the class web page.
- Lecture presentations from previous lecture (non-lab) based versions of course are also available on my web page.

(please save paper and toner and do not print them out!!)

Class web page

http://www.ceri.memphis.edu/people/smalley/ESCI7205F2013/ESCI_7205_Data_Analysis_in_Geophysics_F2013.html

Be nice to your system administrators

- Mitch Withers, Bob Debula and Deshone Marshall are the system administrators for CERI computers.
- Bob specializes on the Unix machines and Deshone is responsible for PC and MAC maintenance. Chief UNIX Guru – Mitch.
- They keep the computers up-to-date and running efficiently so that we may work.
- Major problems with the computers and printers should be submitted to Mitch, Bob and Deshone via the CERI computer services request form on the CERI main page.

OS's at CERI

- Mac OS X

- The famous Mac GUI (Aqua)
- Plus a poorly understood "secret"

The Mac OS X is actually UNIX!
(not even well hidden under the GUI)

OS's at CERI

- 10 Macs in Student Comptuer Lab in Long Building
- many faculty offices/Labs.

More OS's at CERI

- Various flavors of Linux

Popular, open source (i.e. free) versions (dialects) of UNIX (often described as "UNIX-like", but are UNIX).

Found on a number of machines (especially those of poor graduate students) at CERI,

but not officially supported at CERI.

OS's at CERI

- Solaris 9 UNIX

CERI compute and data servers, many faculty offices

OS's at CERI

- Windows (XP?, 7)

Student Computer Lab in Long Building, many student offices, UM computer labs and other un-enlightened places.

Login –

- everybody login
  - “register”

- Rules for UM Computer/Network use
  - CERI computer etiquette

- NEVER EVER give your password to ANYONE.

Be careful of "phising" requests for this information with threats of shutting down your email, access to system etc.

- Don't open any attachments, click on web links (URLs) associated with these emails. Send them to the trash immediately.

- Mac GIU (based on familiarity with PC GUI)

- Mac philosophy – if you have to read the manual, there is a fatal flaw in the program.

- Mac comes with single button mouse, but handles third party multi-button mice. (Different on laptops – 2-button touchpad, plus multi-finger sensing)

- Click/double click
- Drag & Drop
- Drag "over" to select

- Menus
- current program related - top left
- setup/preferences related – top right

- Dock (putting stuff in/removing stuff from dock)
  - Expose
  - Spaces
  - Stacks
  - Spotlight
  - Dashboard
- (see http://www.macforbeginners.com/page.php?id=155)

- How to personalize Mac desktop.
  - Put folders on desktop

(see http://forums.macrumors.com/showthread.php?t=440541)

  - Get rid of "stacks"

- Applications
- You cannot install applications on the Lab computers.

- You may/should be familiar with these (all installed)
  - MS Office
    - Word
    - Excel
    - PowerPoint

- Applications
- You may/should be familiar with these (all installed)
- Web browser (Safari, Firefox, Internet Explorer, Chrome…)
- Adobe Acrobat Reader
- Google Earth
- QuickTime
- others

- Applications
- You may be familiar with these or they are possibly new
- Adobe Acrobat
- Sea Monkey (or other Web authoring program)
- MATLAB (or Maple, Mathematica)
- UNIX Terminal/Command line programs
- SAC – Seismic Analysis Code

- Applications
- You may be familiar with these or they are possibly new
- Antelope – similar to SAC, more powerful with integtated data base
- GMT – Generic Mapping Tools (follows unix philosophy rigidly)
- AWK and its variants

- Applications
- You may be familiar with these or they are possibly new
  - FTP – File Transfer Protocol
  - SSH – secure shell, remote login
- VNC, TeamViewer, other - screen sharing programs

- Cloud?

Somebody know anything about/want to do this?

- CERI/Global data bases –
  - Seismic
  - GPS
  - Geological
  - Geophysical
  - Topographic
  - Geographic
  - …

- Project

Group – seismogram processing program (open, display, pick, locate, rotate, filter)

Or individual

???