GEOS 5vo8 GPS SATELLITE SURVEYING TECHNIQUES
Schedule for GPS lectures and labs
Spring 2006

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Classes: FO2.2222

Tuesday 700-945pm lec

Office hrs: before and after class or appt. (always here)
Students will make reservations for equipment checkout/familiarization. Students will be informed as to which days not to meet. Sign up sheets will be there for equipment.

Grades:

Mid term exam	25% **Exam March, 2006**
exercises	50%
Semester Project	25%--**NEED TO DEFINE A PROJECT BY TIME OF EXAM. DISCUSS WITH ME.**

OTHER COURSE TEXTS AND RESOURCES

WE WILL USE FREE TEXTS ON WEBSITES. INSTEAD OF THIS YOU NEED TO BUY A (RECOMMENDED GARMIN) WAAS CAPABLE (SEE LINKS BELOW) GPS RECEIVER HANDHELD. THE USDA LINKS AAND PAPERS BELOW LIST SOME OF THEM. COSTS AROUND $100-125 INSTEAD OF A TEXTBOOK. TRY WWW.NAVTECHGPS.COM FOR AN EXAMPLE. CHECK OUT WAAS CAPABLE RECEIVERS AT

http://www.garmin.com/aboutGPS/waas.html WAAS and Garmin handhelds ARE LISTED

WEBSITE TO GET MATERIALS IS IN http://www.utdallas.edu/~aiken/GPSCLASS

TEXTS TO BE USED FOR EXAMS ARE

http://www.utdallas.edu/~aiken/GPSCLASS/
GPS_Guide_e.pdf.

SPCS_TX.PPT.

NEED TO USE “COMPARISON” FILES IN MY WEBSITE AND THE USDA REPORTS BELOW (IT IS SAME ONE BUT MORE COMPLETE DOWNLOAD POSSIBLE) FOR COMPARISON WITH EXERCISES RESULTS.

http://flash.lakeheadu.ca/~bmwelmer/GIS/bigpgsproj.htm code comparison from USDA

http://www.gmat.unsw.edu.au/snap/gps/about_gps.htm WILL ALSO BE MAIN SOURCE OF LECTURES ETC.

http://www.trimble.com/gps/advanced4.html **--planning software—download THIS TO USE IN ALL EXERCISES.**

Montana GPS course FOR SUPPLEMENTARY READING
http://www.montana.edu/places/gps/understd.html

http://www.geod.nrcan.gc.ca/GPS_Guide_e/
--course notes, download SUPPOSEDLY, BUT DOES NOT WORK.

http://gps.faa.gov/ --- WAAS info

A.

NEED TO MAP A BUILDING OUTLINE, A FLAT POLYGON LIKE A PARKING LOT AND THREE POINTS (HYDRANTS, TREES, MANHOLES ETC.). OCCUPY EACH THREE TIMES THIS TIME TO GET SOME STATISTICS ON ACCURACY.

EACH OCCUPATION USE 1 SECOND EPOCHS, STAY LIKE 5 SECONDS. DO IT WITH WAAS AND WITHOUT WAAS.

THEN RE-OBSERVE TWO MORE TIMES AT TIMES AT LEAST ONE HOUR DIFFERENT THAN OTHER OCCUPATIONS.

DOWNLOAD DATA (YOU CAN USE MAPSOURCE SOFTWARE ON THE GEOSCIENCES COMPUTERS ALSO) AND PLOT DATA.
USE AREA MAP OF POINTS AND LOCAL MAPS TO SEE VARIATION OF LOCATIONS AT A SPECIFIC STATION (DO THEM ALL AT THE SAME SCALE TO BE ABLE TO COMPARE THE RESULTS BETWEEN STATIONS ALSO).

ADDRESS THESE POINTS:

1. CHECK PDOP CONDITIONS DURING OBSERVATIONS WITH TRIMBLE.COM PLANNING PROGRAM. USING GPS GUIDE E SKYPLOT TEMPLATES (SEE APPENDICES) FOR MAPPING SATELLITE OBSTRUCTIONS AND USE THOSE TO DETERMINE POSSIBLE BETTER SATELLITE VISIBILTY OBSERVATION TIMES (I.E. COULD YOU HAVE BETTER PLANNED THE SURVEYS).
2. COMPARE THE WAAS AND NON-WAAS RESULTS AND COMMENT. ADDRESS HORIZONTAL AND VERTICAL RESULTS.
3. DO YOUR RESULTS FIT WITH THE FOREST SERVICE GPS TESTS?

B.

USE GEOEXPLORER FOR WAYPOINTS AND SAVE RAW DATA FOR POST-PROCESSING,
PICK AT LEAST 20 FEATURES (YOU DECIDE, STREET SIGNS, MANHOLES, STREET CENTERLINES, ETC.) AROUND CAMPUS WITH THE ABOVE PARAMETERS
BUT ONLY OCCUPY 2 PREVIOUSLY STATICALLY POSITIONED SURVEY NAIL SITES FOR ANALYSIS OF ACCURACY.
DO WAYPOINTS AT EACH STATION AND POST-PROCESS FOR DIFEFERENTIAL GPS LOCATIONS ALSO AND COMPARE.
USE PATHFINDER SOFTWARE FOR POST-PROCESSING BY DOWNLOADING A CORS STATION NEARBY FOR DIFFERENTIAL PROCESSING.
COMPARE RESULTS AS IN 1,2,3 ABOVE.

C. CARRIER PHASE METHODS

1. OBSERVE FOR AT LEAST 2 HOURS AN OBSERVATION OF A SURVEY NAIL SITE (I WILL SEND INFO ON PREVIOUSLY SURVEYED NAILS AND THEIR TENTATIVE POSITIONS). POST PROCESS WITH NGS.NOAA.GOV/OPUS.

2. USING NGS.NOAA.GOV/GEOID DEFINE THE SHAPE AND VALUE OF THE GEOIDAL CORRECTION ON CAMPUS.

3. FIND BENCHMARK CONTROL IN THE METROPLEX FROM NOAA.GOV. AND PLOT THOSE WITHIN 1 MILE OF CAMPUS PERIMETER.

4. USING CORS DATA SETS PICK STATIONS AT LEAST 100 KM APART. USE OPUS TO PROCESS THESE DATA SETS. PICK ONE STATION AS THE ONE TO RE-SOLVE. THEN CALCULATE ITS NEW POSITION. START WITH DATA INTERVALS OF 6 HOURS, 4, THEN 2. THEN USING SKI SOFTWARE, 30 MINUTES, THEN 10 MINUTES AND 5 MINUTES WITH LEICA SKI SOFTWARE. WHAT WERE THE VARIATIONS BETWEEN

THE KNOWN ACCURACY AND THE COMPUTED? ANALYZE THE RESULTS.CHECK OUT SKI KEY FROM MYSELF.

REMEMBER YOU NEED TO STUDY ELEVATION VALUES ALSO

Texts: we will use the INTERNET extensively.

REFERENCES

Wells, D., 1987, Guide to GPS positioning, Canadian GPS Associates, New Brunswick, Canada. For many years the only text for GPS.

Parkinson, BW and Spilker, JL, 1996, Global Positioning System: Theory and Applications, Vol. 1, 2. American Institute of Astronautics and Aeronautics.
This book has a lot of math but you will not be required to utilize that except mostly basic math. You need to learn how to read such technical things and derive information. I will provide them for copying and some chapters.