APPLIED KARST HYDROGEOLOGY
GEO 391 & GEO 371C
Spring 2011

SYLLABUS (subject to revision)

Course structure based 2 class meetings/week (2:00-3:30 PM Tuesday - Thursday) plus 6 additional weekend projects. Weekend dates are still tentative and will be overlapped so as to compete minimally with GEO 420K.

Instructors: Marcus Gary and Jack Sharp

Prerequisites: GEO 476K (for 371C) and GEO 391C (for 391) or instructor’s consent

A maximum of 18 students for total enrollment.

Every other week we will also a review a paper from the current literature or a “classic” paper.

Week 1 – Jan 17 - Course introduction
Lecture – Introduction to Karst
Lab – Visit local cave in Austin area – discuss karst development

Week 2 – Jan 24 – Geologic controls of karstification I
Lecture – How caves/karst form (soluble matrix, fluid flow, dissolution kinetics…)
Lab – Lab dissolution of limestone

Week 3 – Jan 31 – Geologic controls of karstification II (Speleogenesis)
Lecture – Epigene, hypogene, eogene settings, features, processes
Lab – Cave survey and mapping (map GEO building as if cave)

Field Trip 1 – Cave mapping/geological mapping in local Austin caves.

Week 4 – Feb 7 – Karst aquifers and reservoirs as natural resources
Lecture – Overview of karst aquifers and reservoirs in region, country, and globally; Porosity/permeability-heterogeneous/anisotropic properties.
Lab – Potentiometric surface mapping in karst (e-line, pressure transducers in lab)

Week 5 – Feb 14 – Karst aquifer recharge and discharge
Lecture – Mechanisms of discrete and diffuse recharge; karst springs
Lab – Discharge measurements in Waller Creek

Field Trip 2 (Feb. 19)– Install water well network in northern Edwards and Barton Springs Edwards

Week 6 – Feb 21 – Advanced methods in karst surveying
Lecture – Sonar, Lidar, etc. - methods and applications
Lab – Laser scanner in geo building

**Week 7 – Feb 28 – Identification of recharge features**
Lecture – Methods of land surface karst survey; types and sensitivity of features
Lab – Karst survey at Austin area property (CoA with Nico Hauwert)

**Field Trip 3 (Mar. 5) – Karst feature/geology mapping at Camp Bullis**

**Week 8 – Mar 7 – Karst system evolution through geologic time**
Lecture – Examples of multi-phase karst development
Lab – no lab (optional week-long field trip)

**Week 9 – Mar 14 – Spring Break (possible optional field trip to west Texas caves)**

**Week 10 – Mar 21 – Groundwater tracing in karst**
Lecture – Dye tracing principles
Lab – Dye trace in Waller Creek

**Field Trip 4 (Mar. 26) – Dye tracing at Coma Springs with EAA**

**Week 11 – Mar. 28 – Karst geochemistry I**
Lecture – geochemical controls of various karst development settings.
Lab – Geochemical measurements of karst waters (Barton Springs system)

**Week 12 – Apr. 4 – Karst geochemistry II**
Lecture – Isotopes in karst studies
Lab – Speleothems

**Field Trip 5 – Groundwater geochemistry (wells and springs) – collect pressure transducers**

**Week 13 – Apr. 11 – Karst geophysics I**
Lecture – Overview of geophysical methods used in karst
Lab – Electrical resistivity and gravimetry demonstration

**Week 14 – Apr. 18 – Karst geophysics II**
Lecture – Case studies in karst geophysics
Lab – Prepare for final project

**Field Trip 6 (Apr. 22-24) Integrated karst project at Camp Bullis (camping in S.A. area)**

**Week 15 – Apr. 25 – Report writing I**
Lecture – Components of a good report
Lab – generating maps/reports

April 26-29 _ Optional field trip to Fayetteville – optional field trip to Karst Interest Group and Hydro Days meeting in Fayetteville, Arkansas
Week 16 – May 2 – Wrap up
  Lecture – Q/A
  Lab – Final exam

Substitution field projects (may substitute for one or more of the above):


2. Gravity and Total station survey of Flint Ridge Cave.

Grading

Field maps and reports: 70%
Paper reviews: 10%
Final Exam: 20%

Classroom: GEO 3.104