Issues and Developments in Education:

Geometry Across Contexts

C&I 499 Fall 2004
4F Education
Thursdays 5-7:50 p.m.
Bridget Arvold, Facilitator
Office hours:
388 Education Building Tues. 10 – 11a.m.; Th. 4:15 – 4:45 p.m., and by appointment
email: arvold@uiuc.edu Use subject header: 499
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COURSE DESCRIPTION: Experience geometry through activity-based explorative approaches and examine the stranding of geometric concepts within and outside preK – 16 school curricula. Use various technologies to springboard between the concrete and the abstract and assess the advantages and disadvantages of such use. Participants read, write, investigate, model, problem pose, and problem solve in a process-oriented learning environment. A study of dimension will launch the geometry explorations.

GOALS: The course is designed to promote and enhance:
a) Broad perspectives of geometry across pre-K - 16 curricula
b) A natural curiosity in mathematics
c) Intuition as well as inductive and deductive reasoning
d) Connections within mathematics and between mathematics and other disciplines and applications
e) Insights into learning tools (technology in the broadest sense)
f) Enjoyment of mathematics

PARTICIPATION: Dialogue and leadership are major components of participation. Teams and individuals will lead the class in geometrical explorations and discussions of how geometry can be used to enhance mathematics understanding and disposition. Written plans, reflections, and annotated bibliographies complement the written midterm and final exam. A course webpage and a Community Inquiry Lab will facilitate communications.

MATERIALS (available at bookstore):
Books:
Krause, E. F. Taxicab Geometry: An Adventure in Non-Euclidean Geometry by Dover
Abbott, E. A. Flatland by Dover
Mira Math Activities for High School in Nasco Catalog
Exploring Geometry with Geo-Fix Shapes in Nasco Catalog
Manipulatives:
Mira in Nasco Catalog
Crystal Geo-Fix Explorations Kit in Nasco Catalog

OUTSIDE READINGS:
NCTM Principles and Standards
NCTM teacher journals
Other teacher journals
Research articles
Pre-K – 16 Curriculum materials

"TENTATIVE" SCHEDULING TEMPLATE – (topics build upon one another)
Aug. 26 Dimension (Flatland)
Sept. 2 Dimension cont.
Sept. 9 Measurement/Counting (Geoboards)
Sept. 16 Measurement/Proportion

Sept. 23	Student Team Presentations of Flatland
Sept. 30	Modeling/Real World Applications - Guest speaker
Oct. 7	Potpourri of Geometric Ideas (Show and Tell)
Oct. 14	Knots [Midterm DUE. Trace a geometric concept through pre-K – 16 school curriculum, relate its development to associated topics in the curriculum, revise the stranding of the concept (and the entire curriculum if needed) to improve the curriculum in ways that will enhance student learning, and most importantly, provide a sound rationale for your revisions. 6-10 pages. Paper should be a precursor of a publishable manuscript.]
Oct. 21	Student-led explorations/discussions – Patterns & Polyhedra Geo-Fix Shapes and Zome Tool)
Oct. 28	Student-led explorations/discussions – Taxicab Geometry
Nov. 4	Student-led explorations/discussions – Symmetry/Transformations (Mira)
Nov. 11	Student-led explorations/discussions – GPS
Nov. 18	Student-led explorations/discussions – Sphere
Nov. 25	Thanksgiving
Dec. 2	Final student-led explorations / discussions
Dec. 9	Peer review of drafts of final paper
Dec. 16	Final Paper DUE [A position paper on The Geometry of ____: A Vision for the Future. 10 -20 pages. Paper should be precursor of publishable book chapter.]

EVALUATION*:

Daily Participation:	25 %
Short written assignments:	25%
Midterm	25%
Final Paper	25%

* Rubrics or guidelines will soon be available.