EFFECTIVE TEACHING: A SOFTWARE ENGINEERING CAPSTONE COURSE

ANN Q. GATES
CHAIR OF COMPUTER SCIENCE
THE UNIVERSITY OF TEXAS AT EL PASO

SOFTWARE ENGINEERING CAPSTONE COURSE

- Course Description
  - Required two-semester course
  - Semester 1: Requirements engineering (must pass with C or better)
  - Semester 2: Design and implementation
  - Team based; complex project defined by an actual customer
  - Learn-Practice-Apply-Improve cycle
- Audience: Seniors

CURRICULUM DEVELOPMENT

- Learning outcomes
  - Documented and included in syllabus
    - Knowledge and comprehension
    - Application and analysis
    - Synthesis and evaluation
  - Every other year: attainment of student outcomes and learning outcome examined; recommendations are made to instructors and curriculum committee
  - Every 4 years: major review
- Course Repository
  - Resources
  - Templates for documents using IEEE standards

BALANCE OF RESEARCH AND TEACHING

- High-Assurance Transformation System (HATS) GUI
  - Client: Sandia National Laboratories
- Scene and Countermeasures Integration for Munition Interaction with Targets (SCIMITAR)
  - Client: ARL
- Saturn Rings project
  - Client: NASA
- Gravity Data Repository and Processing System (GDRP)
  - Client: U.S. Geological Survey; Pan American Center for Earth and Environmental Studies (PACES)
- Sensor Data Property Specification tool
  - Client: Environmental scientist with Cyber-ShARE Center

PROFESSIONAL DEVELOPMENT CONNECTED WITH TEACHING

- Certification
  - Secondary education
  - IEEE-CS CSDP
- Cooperative learning methodologies for team building
  - Teaching professional and team skills
  - Individual accountability
  - Student-professor reflections
- Communities of practice (Lave & Wenger, 1991)
  - Learners develop the skills, knowledge, and expertise of the group through supported immersion
- Attendance, publication and presentation at education conferences

TEACHING TIPS

- Engage the students
- Help students ask good questions
- Challenge their knowledge
- Provide timely, constructive critique
- Scope your expectations

It's better for students to learn essential concepts deeply rather than many concepts superficially