Mentoring Minority Undergrads in Engineering

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- Academic Expectations
- Mentoring and Advising
- Special Needs

Factors Affecting Freshmen Success

Transitioning between high school to the university environment

Variations in high school educational backgrounds

Exposure to science career opportunities

Freshmen Realities

High School

- Time Management
  - Regimented
- Mindset
  - Test Oriented
- Preparation
  - As Need Basis
- Advisement/Assistance
  - Peers/Parents

University

- Time Management
  - Flexible
- Mindset
  - Critical & Analytical
- Preparation
  - Continuous
- Advisement/Assistance
  - Peers/Faculty/Advisors

Mentoring
&
Advising
Undergrad Students

Undergraduate Research Benefits

- Enhances educational experience
  - Critical Thinking
  - Builds student confidence
  - Awareness of career options
- Equalizes diverse student backgrounds
- Competitive in global environment

Continuous Undergraduate Research Experience

Provide freshmen and sophomores with a persistent and comprehensive undergraduate research experience

C.U.R.E. Goal

Develop a focused interdisciplinary research infrastructure based primarily on undergraduate students.

Components of C.U.R.E.

- Undergraduate Research Development
- Interdisciplinary Research - SenBER

Program Elements

- Summer program
  - Research
  - Critical Thinking Skills Development
- Academic year
  - Technical conference attendance
  - Presentations
  - Networking

Undergrad Research

- General background
- Basic Experiment
- Literature search
- Similar but different project

Foundation of URDP
Critical Thinking ..

- Literature
- Research Activity
- Peer Review

Critical Thinking Skills framework and activities are based on:

"The Thinker's Guide Library"

by The Foundation for Critical Thinking

Critical Thinking Framework

- CT and Literature
  - Template for Analyzing the Logic of an Article
- CT and Research
  - The Logic of an Experiment
  - Post Experiment Analysis
- CT and Peer Review
  - Various CT modules
  - Scoring Rubrics

Critical Thinking - Literature

- General Interest Topics
  - Analyze news articles
  - Analyze scientific article
    - Develop glossary of terms
    - Reviewed - ¨Analyzing the Logic of Reading an Article¨
- Selected research paper in area
  - Glossary
  - Review using CT module
  - Presentation - "Analyzing the Logic of an Article"
- Final Research Report
  - Formatted using guidelines from journal
  - Two CT modules

Critical Thinking - Research

Inquiry based Density Lab

- Introduced to experimental design
- Design experiments using:
  - Brief description of experimental question
  - CT Module - "The Logic of an Experiment"
- Conduct Experiments and review results
- Redesign experiment and repeat
- Analyze and report results:
  - CT module: Post Experiment Analysis
  - Submitted laboratory report

Critical Thinking – Peer Review

- Peer Review Deliverables
  - Inquiry based laboratory reports
  - Posters
  - Abstracts - Symposium/HBCU-UP
- CT Peer Review tools:
  - CT Modules
  - Scoring Rubrics

Students with Special Needs

- Inclusion vs Full Participation
  - magic triangle (DSS-student-teacher)
- Provide Accommodations
  - permit or make possible use of assistive devices and other resources from DSS

Student Responsibilities

- Identify themselves as needing disability accommodations
- Should register with DSS
- Pre-register and allow sufficient time for logistics
- Provide requested documentation
- Participate in developing accommodations

Faculty Responsibilities

- Refer students to DSS
- Understand student self-disclosure
  - Not obligated to disclose nature of disability
- Honor student confidentiality
- Apply consistent standards
- Define course requirements
- Ensure adequate time for DSS accommodations

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