GRAND CHALLENGES FOR ENGINEERING IN THE 21ST CENTURY

THE QEM NETWORK

MINORITY ENGINEERING WORKSHOP

November 13, 2009

GREATEST ENGINEERING ACHIEVEMENTS OF THE 20TH CENTURY

- ELECTRIFICATION
- AUTOMOBILE
- AIRPLANE
- WATER SUPPLY &DISTRIBUTION
- ELECTRONICS
- RADIO & TELEVISION
- AGRICULTURAL MECHANIZATION
- COMPUTERS
- TELEPHONE
- AIR CONDITIONING & REFRIGIRATION
- HIGHWAYS
- SPACECRAFT
- INTERNET
- IMAGING
- HOUSEHOLD APPLIANCES
- PETROLEUM AND PETROCHEMICAL TECHNOLOGIES
- LASERS AND FIBER OPTICS
- NUCLEAR TECHNOLOGIES
- HIGH PERFORMANCE MATERIALS

GRAND CHALLENGES FOR ENGINEERING 21ST CENTURY

- MAKE SOLAR ENERGY ECONOMICAL
- PROVIDE ENERGY FOR FUSION
- DEVELOP CARBON SEQUESTRATION METHODS
- MANAGE THE NITROGEN CYCLE
- PROVIDE ACCESS TO CLEAN WATER
- ADVANCE HEALTH INFORMATICS
- ENGINEER BETTER MEDICINES

GRAND CHALLENGES FOR ENGINEERING
21ST CENTURY con't

- REVERSE ENGINEER THE BRAIN
- PREVENT NUCLEAR TERROR
- SECURE CYBERSPACE
- ENHANCE VIRTUAL REALITY
- ADVANCE PERSONIZED LEARNING
- ENGINEER THE TOOLS OF SCIENTIFIC DISCOVERY
- RESTORE AND IMPROVE URBAN INFRASTRUCTURE

ABET PROGRAM OUTCOMES

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety,
- manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems

OUTCOMES con't.

- f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global,
- economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.