Design of a Surveying Curriculum to Meet Professional Licensing Needs in New Mexico and Surrounding Areas

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OUTLINE

- Introduction
- Employer requirements
- ABET accreditation
- NCEES licensing examinations
- State and University requirements
- Designing the curriculum

Introduction

- New Mexico State University
- Located in Las Cruces, NM
- Survey program stated in 1990
- 4 year degree required for survey licensure in NM since 1995

Introduction

- 3 full-time surveying faculty members
  - Normally teach 9-12 credits / semester
- Occasional part-time faculty members
- Range from 30 to 50 students in program
- Semester system (16 weeks + exams)

Introduction

- Courses are typically 3 semester credits
- One semester credit = 15 hrs lecture
- One semester credit = 45 hrs lab
- 128 credits minimum for degree

Introduction

- Program is ABET accredited
- Students take NCEES Fundamentals of Surveying exam in senior year
- Employers expect good problem-solving and leadership skills

Introduction

- Curriculum review annually
- Changes occur by two means
  - "Flimsie" – course description reviewed by all (reduce duplication of courses)
  - Catalog changes – change degree requirements

Employer requirements

- Industrial Advisory Committee
  - Members of surveying profession
  - Diverse pool of members
  - Meet bi-annually
  - Discuss curriculum, course content, etc.
  - Aid in equipment acquisition, etc.

Employer requirements

- Graduates who can become licenses surveyors (pass NCEES exams)
- Capable of running complex survey equipment
- Supervision of field and office crews

Employer requirments

- Graduates who can research, analyze, and problem-solve
- Emphasis on knowledge over skills
  - Skills will come with employment

ABET accreditation

- ABET is recognized US accreditation body for engineering and technology programs
- EAC, ASAC, TAC, and CAC commissions
- NMSU program is EAC accredited

ABET accreditation

- ABET EAC requirements:
  - 32 semester credits of math and science
  - Math must be calculus or higher
  - 48 semester credits of engineering topics
  - Humanities coursework

ABET accreditation

- Surveying Engineering programs:
  - The program must demonstrate that graduates have competency in one or more of the following areas: boundary and/or land surveying, geographic and/or land information systems, photogrammetry, mapping, geodesy, remote sensing, and other related areas.

ABET accreditation

- NMSU Surveying Engineering
  - Boundary/land surveying
  - Land information systems
  - Geodesy
  - Photogrammetry
  - Electives

NCEES licensing exams

- National Council of Examiners for Engineers and Surveyors
- Nation-wide organization for standardized professional licensing examinations
- States usually add an exam for state-specific laws and regulations

NCEES licensing exams

- 3 series of examinations
  - Fundamentals of Surveying exam
  - Professional Surveying exam
  - State-specific exam

NCEES licensing exams

- Fundamentals of Surveying (FS) exam
  - Taken in NM as senior in Surveying program
  - Others may take after graduation if qualified
  - Leads to qualification as Land-Surveyor-in-Training (LSIT)
  - 8 hour exam covering minimal knowledge needed to be an LSIT
  - Based on having 4-year survey degree

NCEES licensing examinations

- Fundamentals of Surveying (FS) exam
  - Covers 15 topic areas including math, analysis, adjustment, science, computer operations, written communications, law, data acquisition, mapping, GIS, and land development
  - Restrictions on calculator use

NCEES licensing examinations

- Professional Surveyor (PS) exam
  - Taken after internship period (4 years in NM)
  - Must have certification of experience after graduation (may count some pre-grad work)
  - Minimal knowledge needed to be a licensed professional land surveyor

NM and NMSU requirements

- State legislation in 2005 requiring certain core courses to be transferable between all NM public higher education institutions
- Includes communications, mathematics, science and humanities

NM and NMSU requirements

- University requirements (General Education)
  - Math and science
  - Humanities
  - Viewing a Wider World
  - Minimum of 128 semester credits
  - High pressure not to exceed 128 credits

NM and NMSU requirements

- Good correlation between state, university and ABET requirements
- However, need to redesign curriculum to be more flexible for state requirements
- 54 semester credits must come from a 4-year institution

Designing the curriculum

- Primary responsibility falls on program faculty
- Review by Department Head and Dean

Designing the curriculum

- NMSU General Education meshes nicely with NCEES non-surveying topics
- Surveying topics reflect and NCEES exam topics in areas where NMSU concentrates
- Survey topics aimed not only at FS exam, but at PS and state-specific exams too

Designing the curriculum

- ABET math and science requirements exceed NM and NMSU, so ABET used
- Use NMSU General Education requirements as modified to fit NM requirements
- Work with Advisory Committee to decide survey coursework

Designing the curriculum

- Flexibility with surveying/engineering electives
  - Allows recruitment of dual-degrees in surveying engineering and civil engineering
  - Allows additional engineering coursework when program cannot teach electives in a timely manner (has not occurred yet!)

Designing the curriculum

- Need to balance constraints with needs
- 2007-2008 curriculum recently approved
- Normally undergo significant curriculum changes every 2-3 years

Summary

- Curriculum changes guided by Advisory Committee
- Must meet ABET, State of NM and NMSU requirements
- Students and graduates must be capable of passing NCEES exams

Thank you!

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