Redesigning Engineering Graphics to Include CAD and Sketching Exercises

Dr. Richard Jerz
St. Ambrose University
http://web.sau.edu/JerzRichardJ/Professional/Professional.htm

ASEE 2001 Conference

- How should Engineering Graphics be taught?
  - Engineering curriculum?
  - How many semesters?
  - Content?
  - Manual drafting?
  - Computer-aided design (CAD)?

St. Ambrose University – IE110

- A one-semester course
- Theory of engineering graphics
  - Lectures
- Hands-on CAD
  - Labs

Last Year’s Observations

- CAD content was acceptable
- EG book is obsolete
  - Use of instruments for drawing
  - Geometric construction
  - Descriptive Geometry
  - Oblique projection
  - Lettering and lines
  - Multiview drawing construction
- Need to improve focus on drawing creation and interpretation

ASEE2001 Audience Concerns

- Visualization
- Sketching

When CAD is used, how should EG be taught?
Engineering Graphics Goals

- Engineers should be able to communicate effectively
  - Writing courses
  - Design courses (need for EG course)

Need for EG and CAD

- SME – Manufacturing Education Plan (1997)
  - CAD/CAM
  - Geometric dimensioning and tolerancing
  - Blueprint reading
- National Coalition for Advanced Mfg.
  - CAD & Blueprint reading
- Employers
- Student comments

IE110 Course Objectives

- Understand how engineering designs visually are communicated.
- Learn to use advanced modeling computer-aided design software.

This Year’s Changes to EG Course

- Sketching
- Drawing interpretation
- CAD projects

Books

- “Interpreting Engineering Drawings” by Jensen
- “Engineering Design with SolidWorks 2001” by the Planchards

Jensen Book

- Simple to complex
- More material than one semester
- I use 21 of the 52 units
  - Working drawings
  - Inclined and circular features
  - Drawings to scale
  - Surface texture
  - Tolerances and allowances
  - Inch and metric fits
  - Sectioning
  - Auxiliary views
Jensen Examples

- Sketching
  - Simple
  - More complex
- Blueprint reading

Planchards Book

- Project-based
- Current version of Solidworks
- Create models, assemblies, and drawings

Example

- Guide-rod
- Drawing

Future Improvements

- Determine proper number of assignments
- Develop multimedia modules
- Geometric tolerancing

Conclusion

- Achieving course goals
- Textbooks work well together
- How should EG be taught?
- Students enjoy the class (except for the amount of work)

Discussion