BUTTE COLLEGE
COURSE OUTLINE

I. CATALOG DESCRIPTION

DFT 8 - Engineering Graphics II   **3 Unit(s)**

Prerequisite(s): DFT 2
Recommended Prep: NONE

Transfer Status: CSU
34 hours Lecture
51 hours Lab

In this computer-based engineering graphics course students who have already completed the learning objectives of DFT-2: Engineering Graphics I will be introduced to the use of a solid modeling application for simulation of parts and assemblies using Finite Element Analysis (FEA) methodology. Students will model parts and assemblies and will test them using simulation and engineering analysis. Topics include static, frequency, thermal, vibration and drop test analysis methods. The use of simulation to generate engineering reports will be introduced and reports will be generated.

II. OBJECTIVES
Upon successful completion of this course, the student will be able to:
   A. Describe the role of engineering analysis in the engineering design process.
   B. Explain and demonstrate the use of finite element analysis (FEA) to perform engineering analyses.
   C. Set up a solid modeling application to perform engineering analysis using simulation modules.
   D. Analyze parts with static, frequency, thermal, vibration and drop test methods using a solid modeling application
   E. Analyze assemblies with static, frequency, thermal, vibration and drop test methods using a solid modeling application.
   F. Produce engineering reports formatted in standard forms and generally accepted engineering methods using a solid modeling application.
   G. Apply relevant areas of engineering analysis to document attributes of parts, assemblies and associated drawings used in design engineering processes.

III. COURSE CONTENT
A. Unit Titles/Suggested Time Schedule

Lecture

Topics	Hours
1. Course Introduction and Assessments	2.00
2. Introduction to Engineering Analysis and Finite Element Analysis (FEA)	3.00
3. Animation Methods and Applications	3.00
4. Static Analysis Methods and Applications	3.00
5. Static and Frequency Analysis Methods and Applications	2.00
6. Frequency Analysis Methods and Applications	3.00
7. Contact, Static and Thermal Stress Analysis Methods and Applications	5.00
8. Product Data Management (PDM) Methods and Applications	5.00
9. Geometric Dimensioning and Tolerancing (GD&T) and Graphic Standards Application and Methods	2.00
10. Manufacturability and Sustainability	3.00
11. Model Development and Simulated Engineering Analysis	3.00

Topics	Hours
Total Hours	34.00

Lab

Topics	Hours
1. Introduction to Engineering Analysis and Finite Element Analysis (FEA)	4.00
2. Animation Methods and Applications	7.00
3. Static Analysis Methods and Applications	5.00
4. Static and Frequency Analysis Methods and Applications	7.00
5. Frequency Analysis Methods and Applications	6.00
6. Product Data Management (PDM) Methods and Applications	6.00
7. Geometric Dimensioning and Tolerancing (GD&T) Application and Methods	4.00
8. Manufacturability and Sustainability	4.00
9. Model Development and Simulated Engineering Analysis	8.00
Total Hours	51.00

IV. **METHODS OF INSTRUCTION**
    A. Lecture
    B. Collaborative Group Work
    C. Class Activities
    D. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
    E. Demonstrations
    F. Multimedia Presentations

V. **METHODS OF EVALUATION**
    A. Exams/Tests
    B. Quizzes
    C. Projects
    D. Homework
    E. Class participation

VI. **EXAMPLES OF ASSIGNMENTS**
    A. Reading Assignments
        1. Please read the article from Machine Design magazine (September 2011) "Engineering Analysis with Solids Modeling Application". Be ready to discuss at our next scheduled class.
        2. Please read the Introduction to Engineering Analysis. Be prepared to discuss at our next scheduled class.
    B. Writing Assignments
        1. After reading the attached document called "Product Data Management (PDM) Applications" please summarize in your own words the scope of application of PDM to engineering graphics and engineering.
        2. After reading about the applications of thermal simulation please complete the questions on the study guide and submit to the instructor when complete.
    C. Out-of-Class Assignments
        1. Outside of class, go to YouTube on the web and search the terms "Solidworks Simulation with fixed points" exactly as in the quotes. Find the video entitled: "Analyzing a Frame in Solidworks Simulation" and watch video. Answer the following question: "How does

Solidworks manage the beam elements to create a fixed point?" Submit written answers to instructor at next class.

2. Please list the frequency analysis setup tasks introduced in today's lecture outside of class and be prepared to review your results in groups at the next class.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**
   Textbooks:
   A. Kurowski, P.M.. Engineering Analysis with Solid Works Simulation. Schroff Development Corporation, 2011.

Created/Revised by: John Dahlgren
Date: 04/16/2012