

# ILLINOIS VALLEY COMMUNITY COLLEGE



## COURSE OUTLINE

DIVISION: Workforce Development

COURSE: CAD 2203 - Engineering Design Concepts

Date: Spring 2014

Credit Hours: 3

Prerequisite(s):

Delivery Method:  **Lecture**                      **2 Contact Hours** (1 contact = 1 credit hour)  
 **Seminar**                                      **0 Contact Hours** (1 contact = 1 credit hour)  
 **Lab**    **2 Contact Hours** (2 contact = 1 credit hour)  
 **Clinical**                                      **0 Contact Hours** (3 contact = 1 credit hour)  
 **Online**  
 **Blended**

Offered:  **Fall**     **Spring**     **Summer**

IAI Equivalent –**Only for Transfer Courses**-go to <http://www.itransfer.org>:

### CATALOG DESCRIPTION:

This course introduces the CAD technician to key engineering design concepts. Emphasis is placed upon strength of materials (such as stresses, shear, bending, and beam design) and the ability to calculate and analyze the forces that operate upon static structures.

## GENERAL EDUCATION GOALS ADDRESSED

*[See the last page of this form for more information.]*

### Upon completion of the course, the student will be able:

*[Choose those goals that apply to this course.]*

- To apply analytical and problem solving skills to personal, social and professional issues and situations.
- To communicate orally and in writing, socially and interpersonally.
- To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
- To understand and use contemporary technology effectively and to understand its impact on the individual and society.
- To work and study effectively both individually and in collaboration with others.
- To understand what it means to act ethically and responsibly as an individual in one's career and as a member of society.
- To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
- To appreciate the ongoing values of learning, self-improvement, and career planning.

### EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

*[Outcomes related to course specific goals.]*

#### Upon completion of the course, the student will be able to:

- 1.0 Learn and practice the engineering design process
- 2.0 Be able to identify resources for engineering design
  - a. Use technical drawings
  - b. Design systems such as mechanical systems, electrical, pneumatic etc.
- 3.0 Consider human factors in design and engineering
- 4.0 Will recognize and use math and science applications in design and engineering
- 5.0 Taught reengineering and reverse engineering principles
- 6.0 Taught principles of quality control and continuous quality improvement
- 7.0 NSF Grant 0501885 Embedding CQI Technology In Two Year College Technical Curricula places a high value on teamwork, leadership, collaboration, communication, and leadership. Our goal is to continually improve the teaching-learning process.
- 8.0 Students will begin to learn the design process by examining and evaluating previous and upcoming design projects from the award winning MIMC (Making Industry Meaningful in College) program.

## **COURSE TOPICS AND CONTENT REQUIREMENTS:**

1. Students will be able to recognize the importance of technology in the human designed world
2. Students will review the design process including planning, order, iteration, and managing a project
3. Students will be taught the importance of teams in industry
4. Students will be taught principles of reengineering and reverse engineering
5. Students will be taught investigation and research principles for design development
6. Students will be introduced to testing and evaluation designs
7. Students will be introduced to mechanical design systems with an emphasis on
  - a. Mechanisms and machines
  - b. Kinematics
  - c. Motion mechanisms
  - d. Rotary mechanisms
8. Students will be introduced to electrical systems
9. Students will be introduced to pneumatic systems
10. Students will be exploring human factors in design and engineering
11. Students will be reinforcing math and science principles as it relates to analysis and design

## **INSTRUCTIONAL METHODS:**

- Lecture
- Lab
- Assigned Projects
- Group Projects
- Field trips

## **INSTRUCTIONAL MATERIALS:**

Engineering Design, 2<sup>nd</sup> edition, copyright 2013, ISBN-13: 978-1-111-64582-3

## **STUDENT REQUIREMENTS AND METHODS OF EVALUATION:**

- Completion of assigned problems
- Required reading of text
- Periodic tests/quizzes
- Group projects
- Problem based learning

A= 90-100

B= 80-89

C= 70-79

D= 60-69

F= 0-59

## **OTHER REFERENCES**

## Course Competency/Assessment Methods Matrix

CAD 2203; Engineering Design Concepts		Assessment Options																															
For each competency/outcome place an "X" below the method of assessment to be used.	Assessment of Student Learning	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Assignment	
	Direct/ Indirect	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	I	I	I	I	D	D							
1.0 Learn and practice the engineering design process		X			X			X	X			X						X															
2.0 Be able to identify resources for engineering design		X						X	X			X						X															
3.0 Consider human factors in design and engineering		X						X	X			X																					
4.0 Will recognize and use math and science applications in design and engineering		X			X			X	X			X																					
5.0 Taught reengineering and reverse engineering principles		X		X	X			X	X			X																					
6.0 Taught principles of quality control and continuous quality improvement		X			X			X	X			X																					

CAD 2203; Engineering Design Concepts		Assessment Options																																		
For each competency/outcome place an "X" below the method of assessment to be used.		Assessment of Student Learning																																		
Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below.		Direct/Indirect	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Assignment			
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