Fall 2014

COURSE SYLLABUS
CAD 200
ENGINEERING AND MANUFACTURING TECHNOLOGY
WITH CAD
3 Semester Hours

Faculty: Mr. Nicholson
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Office Hours: Mon. 4:00-6:00 p.m. Wednesday 3:00-5:00 p.m., Thursday 11 a.m.-Noon p.m.
Class Time: CAD-200-01 LEC T 0500pm-0700pm. MTC 301. Begins 09/9/13
LAB T 0715pm-1015pm. MTC 301

COURSE DESCRIPTION
This course focuses on integrated computer-aided drafting and computer-aided manufacturing used in
the engineering and manufacturing industries, geometric dimensioning and tolerancing with American
National Standards Institute (ANSI) standards, including Y14.5M-1994, International Standards
Organization (ISO) and engineering drawing and related documentation practices. This course also
includes vector analysis for fluid power, computer numerical controls, manufacturing, materials and
processes, threads and fasteners, springs, gears, shafts, cams and bearings. Proficiency in technology
print reading is emphasized in this course.
Laboratory fee: $30.00
Software not required for student. Everything provided.
Textbook:
Lecture & Lab: Parametric modeling with AUTODESK INVENTOR 2012 Randy H Shih, SDC
Publishers ISBN 99781585036462

Course Objectives:
Upon the completion of this course, the student will be able to:

1. Create drawing elements with Autodesk Inventor software assign layers, assign colors and
assign linetypes.
   - Given software and a station the student will create, name and set Inventor drawing
     database layers
   - Given software and a station the student will set and display customary Inventor industry
     linetypes for a 3D drawing database
Addresses GEO 7

2. Create drawing elements using automated CAD 3D features
   - Given software and a station the student will set fields/settings and options to
     configure a worksession efficiently
   - Given software and station the student will select surfaces to sketch base feature views
   - Given software and a station the student will demonstrate file naming,
     use conventions, choosing correct files and using correct file extensions
Addresses GEO 7
3. Display accepted engineering ethics in implementing an engineering assembly
   - Following guest speaker presentation, identify ethical issues, dilemmas, and possible resolutions in developing a product for a specific customer.
   - Given software a project objective and a station the student will use the engineering professional codes of ethics in developing a customer product including ethics such as environmental impact sensitivity, copyright, accountability and conflict of interest issues.
   - During class laboratory, class work and testing activities the student will adhere to the institutional student code of conduct and academic integrity policies

Addresses GEO 7

4. Specify, develop using 3D CAD software, fabricate and model with 3D printer, test and redesign a functioning engineering product assembly.
   - The student will produce specifications for a product and sketch base feature views with tolerance and engineering standard notation
   - The student will cut a section or slice a solid model to extract 2-D interior views to reveal detailed and internal features
   - The student will write a specification for each part that has only one possible interpretation

Addresses GEO 7

5. - Create a drawing model using intermediate and advanced CAD and engineering skills
   - Given 3D software and a station the student will demonstrate command of Sketching, extruding, revolving and sheet set up views
   - Dimension to specify drawing elements by establishing height, width, depth and all other views and features of a drawing
   - Use polar and rectangular arrays to describe a solid model
   - Demonstrate dynamic rotation of a 3D block to precisely rotate a 3D model around the horizontal, vertical and perpendicular to each-axis views in order to display interference and resolve manufacturing assembly problems
   - Set, store and retrieve a text style to add text to a drawing with Autodesk Inventor commands and make text annotative in a 3D solid model

Addresses GEO 7

6. Using the project development process develop, specify, design and model a product for a specific customer
   - Use boolean CAD operations to create and model a product for a specific customer
   - Use dimension techniques in conjunction with constraints to create a product specification that can only have one interpretation
   - Given lessons and an assignment with 3D modeling software the student will demonstrate the stretch, move, scale, mirror, rotate, lengthen, trim break, chamfer, fillet, stretch, offset and extend commands to create a product model

Addresses GEO 7

7. - Create 3D representations as an isometric drawing
   - Manipulate Isometric drawings with principal edges at 120 degrees
   - Use 3D modeling commands to generate 2D Multiview drawing sheets from a 3D solid model
   - Create 3-D representations as a physical ABS material model to within .002” overall accuracy
   - Given software and a station the student will use constraints in order to create a single interpretation model

Addresses GEO 7

8. Create solid figures to establish an accurate mathematical model for use within a functional CAD database
   - Given the lectures for the first six weeks the student will create a 3D model using all the Inventor features listed from the seven objectives above
-Given a presentation, assignment and lab practice create solid figures by adding and subtracting primitive geometry with boolean operation commands such as union, align, intersect and subtract.
-Edit primitive solid shapes with revolve, extrude, slice and section feature commands.

Addresses GEO 7

9. Create hardcopy of a 3D CAD drawing on an industry standard sheet.
   -Given a presentation and a practice assignment the student will plot a Inventor drawing to a specified scale.
   -Given a presentation and a practice assignment the student will fit a plotted Inventor drawing onto a specified standard Paper 8 1/2 " x 11" paper.

Assignments

Practice assembly drawings as assigned. Week 1-12
Arbor press product for a specific client (Must be done in class). Week 1-12
Create 2 section drawings. Week 1-12
Reverse Engineer a product (semester assignment) Includes Assembly Drawing and Detail Drawings for a reverse engineered product: Student brings in a part and assembly then create drawings in class. Includes sketch and four files: .ipt, .iam, Week 3-12
Create an Isometric section drawing. Week 1-12
Draw a thread or Fastener Drawing (Must be done in class). Week 1-12 AutoCad may be used
Review and last lesson. Week 13
Final exam. T 12/09/14 0500pm-0700pm -two hours maximum

Quizzes and Tests

Midterm Test
Vocabulary Quiz
Isometric Drawing and Chapter question Quiz
Solids Drawing and Constraints Quiz (.iam files and .ipn files)
.ipt file Quiz .iam file Quiz and .idw file Quiz
Final Exam Tuesday December 9, 5:00 p.m.—two hours maximum.

Course Details

Dates are approximate. Facebook, instant mail and similar are not allowed when you are working on your assignment. Take a break and leave your terminal if you must catch up on “Social Media”. Please don’t mix your assignment with “Social Media”.

Electronic Writing and Research Assignment
Students are required to complete an electronic assignment.

TOPIC FOR PAPER. Research the topic “additive manufacturing”. Traditional manufacturing has consisted of “subtractive manufacturing.” Explain (as many as you can) the differences and what impact do these differences have on:

1. Costs of “start-up” to produce a product including the costs of startup equipment.
2. Costs to produce small quantities of manufactured items.
3. Compare the advantages and disadvantages of the traditional method vs the new.
Find some articles on this topic and evaluate those articles to explain in a 2 page paper, single spaced. This is an upper level course, so your paper should have (near) perfect grammar and content. You may work on your paper in class.

**WIKIPEDIA REFERENCE NOT ALLOWED**
Grading/Exams: Grading will be determined on the basis of tests, drawing assignments, homework assignments, quizzes, Electronic Writing and Research project, laboratory assignments, CAD projects and final exam. This course will include a comprehensive final exam. Final grade will be weight as follows:

- CAD Drawings 25%
- Exams and quizzes 20%
- Lab Assignments 20% (Creating .ipn, .iam and .idw files)
- (Book examples or exercises demonstrated or assigned by teacher)
- Assembly Drawing exercise 10%
- Electronic Writing and Research Project 10%
- Final Exam Tue 12/9/14 0500pm-0700pm 15% (Two hours max. allowed)

Conversion of numeric average to Final (Letter) Grade:

- 90 - 100 = A
- 80 - 89 = B
- 70 - 79 = C
- 60 - 69 = D
- 0 - 59 = F

**H1N1 STATEMENT:**

Blackboard is being used as a supplementary site in this course. To access course content in Blackboard you need to have access to a computer with an Internet connection, (other requirements may apply). Computers that meet these requirements are available on campus in MTC 200, AAB 217, HH 100, GH 204, WDC 305, and AHB 108. Please follow these directions.

Login Information
From WorWic home page, point to “Quick Links” (top right) and click the “Blackboard Login” link.
Enter your Wor-Wic user ID (this is your birthday written “backwards” XXXX/MM/DD) and password (same as your Wor-Wic email user ID and password). Don’t know your user ID or password? Contact Student Services or your instructor.

Required statement concerning use of academic integrity and computer usage policy:

All students logging into Blackboard affirm that they understand and agree to follow Wor-Wic Community College policies regarding academic integrity and the use of College resources as described in the college catalog. Wor-Wic Community College considers the following as violations of the computer usage policy:

In the event of a flu epidemic or other emergency that results in the suspension of classes, faculty will be communicating with students about their courses and course requirements, such as assignments, quiz and exam dates, and class and grading policies, via Blackboard. Students will be responsible for completing all these assignments in accordance with class policies. Information about the resumption of classes will be communicated via the College’s website and email system.

**Late Assignment Policy**
All homework, laboratories and reading assignments must be submitted on time. NO CREDIT FOR LATE WORK. If you do not do your homework, you will not be able to keep up with the class.

**ACADEMIC HONESTY POLICY**
Students are required to maintain a high level of academic performance. Cheating and plagiarism are defined in Wor-Wic's Student Conduct Policy found in the College Catalog. Infractions of this policy will result in the student's failure for the assignment or test.
RUBRIC for GEO 7

Cover Page 5%
Covers necessary information
Title, name course info, date

Report 65%
Spelling 5%
Thesis statement 15%
Body of report 30%
Accurate
Readability
Length
APA format
Proper Citations
Summary 15%

Summary

Works Cited 10%
Minimum # of references

GEO Relevance to GEO 7 10%
Explained relevance to course

Explained relevance to program & self-skills needed to succeed 20%