

IENG 405 – Design for Manufacture

Semester: Fall 2014
Pre-Req: IENG 302/303
Credit: 3 Credit hour lecture
Engineering Science: 33%,
Engineering Design: 67%

Time: 12:30 - 1:45, TR
Class Room: 107 MRB-E
CRN 405: 88428
Section: 1

Instructor: Dr. Rashpal S. Ahluwalia
Office Room: 353E MRB
Email: rashpal.ahluwalia@mail.wvu.edu
Phone: 304-293-9430
Office Hours: TR: 2:30 – 4:00 PM

Catalog Description: Aspects of computerized manufacturing systems will be covered, with emphasis on computer fundamentals, computer-aided design and manufacturing, numerically-controlled (NC) machine tools, part programming, and real time process control.

IE Program Outcome 1: *Students will have acquired the ability to use modern and classical industrial engineering methodologies such as operations research, **manufacturing systems, computer programming**, simulation, production systems, human factors, ergonomics, engineering statistics, quality control, and engineering economics.*

Key Abilities: Upon successful completion of this course, the student will have knowledge of:
 1) Computer Aided Design, 2) Computer Aided Manufacturing, and 3) Process Control

Key Abilities	Key Ability Assessment					
	Project #1	Test #1	Project #2	Test #2	Project #3	Test #3
Key Ability #1	X	X				
Key Ability #2			X	X		
Key Ability #3					X	X

Textbook: There is no required textbook for the course. However, the following books are recommended as reference. Lecture notes will be available via eCampus (<https://ecampus.wvu.edu>). You can log on to eCampus using your mix ID and password. You should check eCampus on a regular basis for due dates and other course related material.

1. Automation, Production Systems, and Computer Integrated Manufacturing, Mikell Groover, Second Edition, Prentice Hall, 2001, ISBN: 0-13-088978-4
2. Computer Aided Manufacturing, Chang, Wysk, and Wang, Prentice Hall, 1991, ISBN: 0-13-161571-8
3. Product Design for Manufacture and Assembly, Boothroyd, Knight, and Dewhurst, second edition, Taylor & Francis, 2009, ISBN: 0-8247-0584-X

Attendance: Student attendance is mandatory unless excused by the instructor. The basis for an excused absence will follow the university policy. There are no points for attendance, but it can affect grade in a borderline situation.

Social Justice: *West Virginia University (WVU) is committed to social justice. I concur with that commitment. I expect to foster a nurturing learning environment that is based upon open communication, mutual respect, and non-discrimination. WVU does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color, or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, you must make appropriate arrangements through Disability Services (293-6700). They will identify the nature of the accommodation your disability requires.*

Academic Integrity: *The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University, regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code. You are encouraged to get help from peers, internet, or any other source. However, projects and tests are individual activities. You must do your own projects. Acts of academic dishonesty, such as cheating or plagiarism, will be reported to the university administration, and will result in a failing grade (F).*

Tests: There will be three tests. There will be no make-up tests.

Projects: There will be three projects. All projects will be due at the start of the class on the assigned due date. Due dates will be posted on eCampus. **Ten percent per class period will be taken off for late work.** Project reports should be neatly typed (including equations, if any) in MS Word using 10 or 11-point font, with 1" margins. Section headings should be in bold. All figures and tables should be numbered, have appropriate captions, and referenced in the text by their number. Pages must be numbered as page x of y. The report should include the following sections:

1. Problem statement (what needs to be done)
2. Project description (how was it done)
3. Conclusions
4. References

Grading: Projects (1x10%, 2x15%): 40% A =>90, B =>80, C=>70, D=>60, F<60
 Tests (3x20%): 60%

Tentative Schedule:

	1.0 Computer Aided Design	
1	1.1 Introduction to AutoCAD	
2	1.2 Geometric Transformations	
3	1.3 Geometric & Solid Modeling	Project 1 (CAD/CAM)
4	1.4 Interfacing with CAD Systems	Test 1
	2.0 Computer Aided Manufacturing	
5	2.1 Numerical Control Machines	
6	2.2 Computer Aided Part Programming	
7	2.3 Design for Manufacture and Assembly	
8	2.4 Group Technology & Process Planning	Project 2 (DFMA)
9	2.8 Flexible Manufacturing Systems	Test 2
	3.0 Process Control	
10	1.1 Boolean Logic	
11	1.2 PLC Hardware and Software	
12	1.3 Ladder Logic	Term Paper
13	1.4 Dynamic Systems	Project 3 (PLC)
14	1.5 Control System Design	Test 3 (12/16/14) 11 -1 PM

Prepared By: Dr. Rashpal S. Ahluwalia

Date: August 18, 2014