

Southern Illinois University
Computer - Aided Manufacturing
IT 445 Syllabus

- I. COURSE NUMBER & TITLE: IT 445, Computer - Aided Manufacturing
- II. CREDIT HOURS: 3 credit hours
- III. PREREQUISITE: IT 208, computer programming, or consent of Instructor
- IV. DESCRIPTION OF COURSE: An introduction to the use of computers in the design and manufacture of products. Includes the study of direct and computer numerical control, part processing, and industrial robots.
- V. TEXTBOOK: "Computer-Integrated Manufacturing, 3rd Edition" by James A. Rehg and Henry W. Kraebber, 2005, Prentice Hall. Publisher's Price: \$123.60.
- VII. STUDENT RESPONSIBILITIES:
 - a) All examinations must be taken at the scheduled time. If not, there will be an immediate 10% penalty and an additional penalty of 10% per week for every week they are late. Exceptions to this policy will be for TDY, emergency leave, etc.. Upon return from TDY, etc., the student has one week to complete the late work before the late penalty kicks in.
 - b) All work submitted late **MUST HAVE ATTACHED DOCUMENTATION** to support its being considered for "late - excused" status. Failure to submit said documentation will be grounds for refusing such status by the instructor. Talking to the instructor in the hallway during break, etc., does not constitute "documentation".
- VIII. STUDENT EVALUATION:
 - a) The course consists of three examinations (Midterm, Final, & Terms). Students have the option of when, during the course period, to take this exam, but they must be completed not later than the dates shown under the "Schedule of Activities". The Midterm and Final Exams consist of multiple choice questions. All exams are **closed book** unless otherwise noted. The "Terms & Definitions" test is a matching exam

It is suggested the student begin work immediately on memorizing the terms and definitions; this will help the student study for the multiple-choice tests as well.

The Midterm Exam covers material from Chapters 1, 2, 10 & 12. The breakdown of points for this exam is 29 multiple choice questions of which you must answer any 25. Each counts 4 points. The question breakdown is Ch. 1 → 13 questions; Ch. 2 → 9 q's; Ch. 10 → 4 q's; Ch. 12 → 3 q's.

The Final Exam covers materials from Chapters 3, 4, 5, & 11. The breakdown of points for this exam is 34 multiple choice questions of which you must answer any 31. Each

counts 3.25 points. The question breakdown is Ch. 3 → 4 questions; Ch. 4 → 11 q's; Ch. 5 → 13 q's; Ch. 11 → 6 q's.

Test review questions are also provided with this syllabus to aid students in preparing for each test. A word of caution..... students that use ONLY the review questions as a methodology to study for tests and forgo reading of the chapters usually do poorly on the tests. The review questions are an accommodation by the Instructor to minimize the student's "review" time for tests and to provide areas of study.

The terms & definitions test is a matching test. Little attempt is made to change or confuse the student regarding the definition of a term. However some of the definitions are very long, in those cases the student should strive for a good understanding of the term. Students have the option of when, during the course period, to take this exam. The terms test should be **taken after completing the other two exams**.

- d) Grading will be based on the assignments noted above. The final grade will be based on the following:

Midterm	100 pts	A	90 - 100%
Final	100 pts	B	80 - 89%
Terms & Definitions	50 pts	C	70 - 79%
	=====	D	60 - 69%
	250 points available	F	< 60%

IX. INCOMPLETES:

It is the policy of the professor not to give Incomplete grades. Occasionally, one realizes that events do occur which merit the awarding of an Incomplete. In accordance with written university policy, an Incomplete grade will not be granted for any reason in a case where the student would not pass the course if all unfinished assignments were converted to zero points. Effectively, this means that you have to have completed around 75% of the course with very high marks to even be considered for an Incomplete. In the event the student feels an incomplete is applicable in their case, it is their responsibility to document the reason in writing and to secure it's approval. If you fail to complete this step, an Incomplete will not be granted. Talking to the instructor on the phone, or in the hallway, does not constitute "in writing".

- X. INSTRUCTOR: Dennis Lithgow denbeclithgow2@yahoo.com
 (501) 988 - 1391 (Office, Tues, LRAFB, 10:00 - 3:00)
 (903) 751 - 4631 (Home -- Best to call before 9 PM)

- XI. INSTRUCTOR AVAILABILITY: Your instructor is available for conference and / or assistance immediately before, during, and after scheduled class periods or at a mutually - agreed upon time and place. Students are encouraged to discuss problems with assignments, course material, suggestions, etc..

XII. SCHEDULE OF ACTIVITIES:

Assignment	Due Date
Midterm Exam	12 Oct 09
Final Exam	30 Nov
Terms & Definitions	30 Nov

Test Review Questions:

Test 1: Keep in mind that several questions reference the terms and definitions for these chapters.

- C1..... goal of manufacturing....
- C1..... stages ... of the "manufacturing retreat"
- C1..... key factors in the rise of industrial prowess.....
- C1.....% overrun in development cost
- C1..... order-winning criteria.....
- C1..... responsible for satisfying the order-winning....
- C1..... enhance the order-winning criteria....
- C1..... CIM implementation procedure....
- C1..... studies show that cost-added operations....
- C1..... company wishes to measure their success in implementing CIM.....are commonly suggested parameters....
- C2..... manufacturing system pecking order, going from lowest volume production to highest volume production...
- C2. There are several questions dealing with manufacturing systems covered on pages 45-47 in the text.
- C2..... customer lead time and manufacturing lead time.....
- C2..... There are several questions dealing with product strategy covered on pages 49-50 in the text.
- C2..... sets the order-winning and order-qualifying criteria.....
- C2..... activity determines the type of machines....
- C10..... process operation categories.....primary and secondary operations....types....
- C10..... heating and cooling of solid metals....
- C10..... traits ... a "flexible" manufacturing system....
- C10..... advantages ... a "flexible" manufacturing system....
- C10..... FMC....
- C10..... large volumes of individual parts....
- C12..... cell controller is primarily....
- C12.....advantage of enabler software....
- C12..... a analog control signal....
- C12..... to track individual parts
- C12..... member of the control and information protocol....

Test 2: Keep in mind that several questions reference the terms and definitions for these chapters.

- C3..... decreases in product cost
- C3..... There are several questions dealing with form, fit, and function covered on pages 77 in the text.
- C3..... during the synthesis step of the design process...
- C3..... techniques used in the analysis stage of the design process....
- C3..... Concurrent engineering ...automating...criteria...model... Pages 90-92
- C3..... Production Engineering....elements... Page 93
- C3..... routing sheet...
- C3.....tooling and fixture engineering..... Page 99-100
- C3..... methods for developing time standards....
- C4..... current generation CAD systems.....
- C4..... wireframe

C4..... solid model....
 C4.....surface model....
 C4..... primary application for 2-D CAD....
 C4..... use a 3-D wireframe drawing to create....
 C4..... systems for the creation of type of CAD drawings....
 C4..... migration from2-D wireframe modeling....
 C4..... Boundary Representation....
 C4..... solid model Associativity....
 C4..... popular use for CAD....
 C4..... system would be least effective...
 C4..... part exhibits the properties.....CAD software...2-D wireframe...3-D wireframe... Surface model.... Solid model...Page 111-116
 C4..... mostly planar surfaces, little interior detail, sheet metal part (thin), simple geometric shapes.....
 C4..... parts with complex curves in three dimensions, little interior detail, sheet metal part....
 C4..... parts with complex curves in 3 dimensions, lots of interior detail, analysis of the parts in software is a requirement....
 C4..... Product Development Management software...
 C5..... the computer to analyze and evaluate a design....
 C5..... Design for Manufacture and Assembly software...is.....goal.....
 C5..... catch problems with a product.....
 C5..... Finite element analysis (FEA)... engineering application....
 C5..... Area, Volume, Mass, Radii of Gyration, and Products of Inertia are all.....
 C5..... Moment of Inertia (MI)... Mass properties....
 C5..... Virtual prototyping software.....
 C5..... build a sample of a new design quickly....
 C5..... group technology....
 C5..... type of CAPP.....
 C5..... popular file format for transferring....
 C5..... effort to develop a data exchange format that.....
 C5..... two NC programming languages.....
 C5..... computer simulation be used for.....
 C5..... advantage of manufacturing simulate....
 C5..... the logical process of an expert.....
 C5..... stage of development would you say current....
 C11.... Robot, CNC machine, Machining center, Milling machine....
 C11.... Jointed spherical robot, Spherical, or polar, r, Cylindrical robot, Cartesian robot....
 C11..... end of the robot's arm....
 C11..... common job...
 C11..... off-line....
 C11..... asynchronous transfer system....
 C11..... walking beam....
 C11..... Automatic Guided Vehicle (AGV) would most likely....

TERMS FOR TEST (page # in the text)

Manufacturing (4)	Repetitive design (77)
Manufacturing strategy (10)	Concept design (79)
Setup time (16)	Analysis (82)
Burden rate (16)	Rapid prototyping (84 & 165)
Captured quality (18)	Concurrent engineering (86)
Warranty quality (18)	Tomestones (99-100)
Total quality (18)	CAD (108)
Manufacturing space ratio (19)	Wireframe model (111)
Cycle stock (21)	DFMA (144)
Safety stock (21)	CAE (144)
Anticipation stock (21)	FEA (152)
Inventory turns (21)	Group technology (GT) (177)
Flexibility (22)	CAM (190)
Distant standard (22)	Computer simulation (199)
Uptime (22)	Enterprise network (204)
CIM (24)	FMC (411)
Simplification (30)	In-line fixed automation (414)
Customer lead time (49)	Rotary fixed automation (414)
Manufacturing lead time (49)	Robot (426)
Make to Order (50)	Robot system (426)
Assemble to Order (50)	AGV (465)
Make to Stock (50)	ASRS (476)
Form (77)	Programmable logic controller (PLC) (500)
Fit (77)	Code 39 (527)
Function (77)	Total quality management (TQM) (544)