ENGR 480 Manufacturing Systems Spring 2003

Facts:
- Instructor: Ralph Stirling
- Office: CSP262, 527-2071, stirra@wwc.edu
- Class: 1:00 – 1:50 MWF CSP164, Lab 2:00-5:00 Th KRH105
- Webpage: http://engr.wwc.edu/students/classes/engr480
- Text: Industrial Automation and Process Control, by Jon Stenerson

Most Important Background:
- Basic circuit analysis – if you have forgotten all your Circuits, you will have trouble in this class – review will be in order
- Instrumentation – if you were completely baffled by sensors and signal conditioning, you will have trouble in this class
- Machine design and Advanced CAD – you will need to design a lot of fixtures and parts for the lab project

What you will learn in this course:
- What manufacturing is all about
- How to automate the handling and creation of parts
- How to make nifty mechanical widgets that actually do things
- How to use pneumatics
- How to write useful memos and reports that your boss will be pleased with
- How to do some machining
- How to wire electrical controls

What your grade will be based on:
- Memos and reports – most of your work will be documented in memo and report format. Grading will be on content and writing quality.
- Lab notebook – keep a record of your lab and shop work in a bound notebook. Also a good place to jot down notes and ideas for designs.
- Quizzes, homework, and tests – I may have some more traditional forms of evaluation from time to time as needed.
- Reading – you will receive 2% extra credit for reading an article per week from a trade magazine or journal, such as Design News, Industrial Automation, Sound & Vibration, Motion Control, ASME or SME publications (print or online editions). Just send me an email each week telling me what article you read.
- Attendance – marginal grades may be decided by attendance record.
- Grade thresholds will be approximately: A: 90%, B:80%, C:70%, D:60%

Useful Supplemental References:
- "Designing Technical Reports" by J.C.Mathes and Dwight W. Stevenson
- "Pneumatic Systems – Principles and Maintenance" by S.J.Majumdar
- Reid Tool catalog

Special considerations:
>   If you have a learning disability or otherwise need special consideration, please contact the appropriate campus office and have them discuss your needs with me. Since you are all seniors, I assume you will know this process by now if you have such a problem.

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Notes on Laboratory and Shop Usage:

- CLEAN UP after yourself. There are shop vacuums, brooms, and brushes in both the lab and the shop. There will also be a webcam in the shop to record the condition of the room whenever the light goes on or off.
- PUT TOOLS AWAY. Each team has a lockable toolbox for the most basic tools. You may also put parts you are machining in your toolbox so they don't end up in someone elses fixture.
- USE SAFETY EQUIPMENT. Eye shields and ear protectors are provided to protect you when using machinery. Please use them.
- ONLY USE MACHINES YOU ARE FAMILIAR WITH. If you haven't used a lathe before, don't use the shop lathe without instruction. If you haven't used a vertical mill before, get help first. Sources of help are me, Jim Forsyth (Technical Support Services), Don Dawes (Dept of Tech), and Greg Brooks.
- RECORD YOUR WORK in your lab notebook.
- DO NOT LET OTHERS INTO THE SHOP. If another student wishes to have shop access, they must get approval and an access code. I can give approval, and Renee gives access codes.

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Approximate Schedule

Week	Date	Time	Topic
1	Mar 31	1:00	Introduction, history, terms
	Apr 2	1:00	Fit and tolerance
	Apr 3	2:00	*Lab – examine cutting cell & parts*
	Apr 4	1:00	Memos & reports
2	Apr 7	1:00	Generating motion – linear
	Apr 9	1:00	" "
	Apr 10	2:00	*Lab – Nelson Irrigation tour*
	Apr 11	1:00	Generating motion – rotary
3	Apr 14	1:05	" "
	Apr 16	1:05	Motion Control – pneumatics, relays
	Apr 17	2:10	*Lab – work on fixture designs*
	Apr 18	1:05	Position sensing
4	Apr 21	1:00	" "
	Apr 23	1:00	PLC's – digital logic
	Apr 24	2:00	*Lab – fabricate fixture components*
	Apr 25	1:00	PLC's – ladder diagrams
5	Apr 28	1:00	PLC's – timing diagrams
	Apr 30	1:00	" " "
	May 1	2:00	*Lab – fixture assembly and test*
	May 2	1:00	PLC's – state machines
6	May 5	1:00	" " "
	May 7	1:00	" " "
	May 8	2:00	*Lab – PLC programming*
	May 9	1:00	Proportional control
7	May 12	1:00	" "
	May 14	1:00	" "
	May 15	2:00	*Lab – complete cell testing*
	May 16	1:00	Advanced PLC operations
8	May 19	1:00	" " "
	May 21	1:00	Factory communications – wiring
	May 22	2:00	*Lab – part quality analysis*
	May 23	1:00	" " - signalling
9	May 26		**Memorial Day – no class**
	May 28	1:00	" " - protocols
	May 29	2:00	*Lab – integration of multiple cells*
	May 30	1:00	HMI
10	June 2	1:00	Additional topics
	June 4	1:00	" "
	June 5	2:00	*Lab – final testing of project*
	June 6	1:00	" "
	June 9	1:00	Final project presentations

29 lectures, 10 labs