FINAL EXAMINATIONS

YOUR GUIDE TO ACADEMIC SUCCESS ON YOUR FINALS

EMLC Presentation
ME 3380
5:30-7:00 p.m.
Monday December 7th

Review & Final Exam

ECOR 1010
Lecture 24

Carleton UNIVERSITY

Online Teaching Evaluations

November 24 – December 8

Check your Carleton email for a link to your Online Teaching Evaluations or log in at:

oirp.carleton.ca/ote

Review

- From the calendar/course outline:
  - Technology, society and the environment. Graphical design communication: sketching, graphical projections, CAD; Managing data: statistical methods; spreadsheets. Design analysis: matrix programming software; symbolic computer algebra systems. Design process: proposals; reports; presentations; reporting software.

Objectives/Learning Objectives

- explain engineering measurements and errors, and convert engineering units
- perform calculations accounting for measurement errors
- analyse data using engineering statistics
- describe the engineering design process
- implement the engineering design process
- (re)design a simple object to meet specified needs under given constraints
- implement 3D printing techniques
- interpret standard engineering drawings
- create engineering models and drawings using CAD software
- implement various engineering software tools (including spreadsheets, matrix programming, symbolic computer algebra)
- generate engineering reports and design documentation
- describe the roles and responsibilities of professional engineers (professionalism, ethics, health and safety, protection of the public and the public interest)
- describe the impact of engineering/technology on society and the environment

Results?

BLACK&DECKER

JOB OPPORTUNITY

		Job Number:	**418**
POSITION:	**Student Engineering Assistant**	**Level:**	**Temporary / Summer Employment**
DEPARTMENT:	**Engineering**	**Reports To:**	[redacted]
LOCATION:	**Brockville**		

SUMMARY:

We currently have a need for a summer student to assist with new product development. The position involves working with the Product Development teams to test and evaluate prototypes. The timing for this opportunity is from May through August 2005.

KEY RESPONSIBILITIES:

- Prototype and competitive product benchmarking and analysis in test lab and outdoor environments.
- Setting up, organization and coordination of product testing, test related product and material and test sites.
- Work with Product Development teams to assist prototype building and evaluation.
- Data collection, manipulation and reporting.
- Assisting casual labour with product test work both indoors and outdoors.

SELECTION STANDARDS:

- Technical education with minimum of one year in a technical or engineering program at a college or university.
- Strong communication skills both oral and written.
- Data gathering, manipulation and reporting skills.
- Excellent computer proficiency.
- Team player attitude.

SPECIAL DIMENSION:

- Strict adherence to safety rules and use of safety equipment will be required.
- Ability to work outdoors for extended periods using various products.
- Most of the work will be on site but there may be requirement to travel.
- In addition to considering internal candidates, we will be conducting a search outside the Company.

HOW TO APPLY:

Please submit an overview of your qualifications to [redacted], Product Development, Brockville, no later than **Tuesday, May 24, 2005 via email.**

Final Exam

- 9:00 am – Saturday, December 12 – Fieldhouse
  - Plan to arrive 10-15 minutes early
  - Section A: Rows 21-39
  - Section B: Rows 1-20
  - Section C: Rows 40-57
- Allowed Time: 3 hours
- PMC students should have email of location
- Pencils & Erasers Only – NO CALCULATORS
- Try not to bring valuables, etc.
  - You can bring coats, small bags, valuables to the desk

Final Exam

- A formula sheet is attached to the exam.
- There may be more than one right answer to some of the questions. You are to select the best and most complete answer from among the alternatives.
- PRINT your Name and Student Number on the exam book and on the Scantron Sheet

➢ ON THE SCANTRON SHEET, use a pencil to fill in the boxes and corresponding bubbles for your LAST and FIRST NAMES, and your 9-digit ID number (100: : :) starting at the left, and the Exam Version Number. Do not fill in extra spaces with zeros.

➢ Darken the appropriate bubbles to indicate your answers for multiple choice questions – 1 bubble per answer

- When finished hand in your SCANTRON SHEET, FORMULA SHEETS AND QUESTION PAPERS.

Final Exam

- Names (no hyphens)
  - First 12 letters of LAST NAME
  - First 8 letters of FIRST NAME
- Course: ECOR1010 (start at left)
- Student ID: 100… (start at left)
- Exam Version No.
- Don't have to answer *Sex* question

edc Scantron Instructions for Students

REMEMBER THE FOLLOWING:
- Always use a DARK lead pencil (HB #2 works well)
- Completely erase any changed answers with a soft eraser
- Mark your answers firmly and neatly
- DO NOT staple, fold, tear or crumple the form.

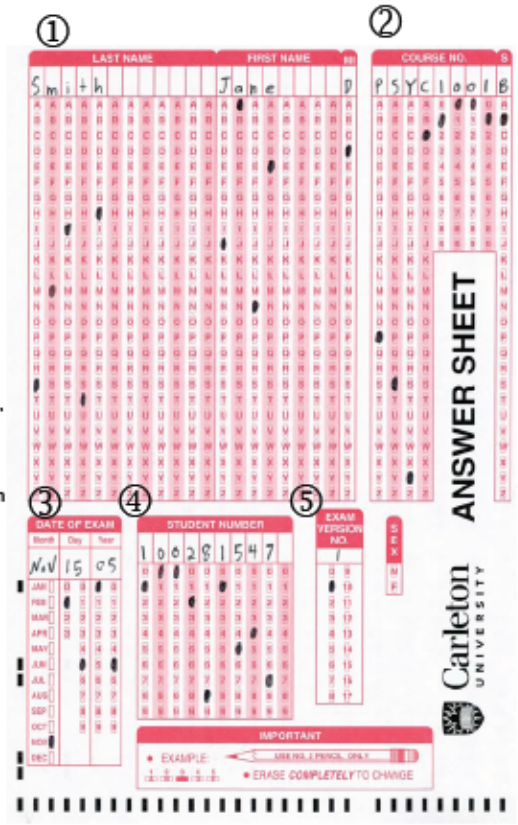
1) In the **FIRST NAME** and **LAST NAME** boxes CLEARLY PRINT your first and last name in the and fill in the appropriate boxes below.

2) The **COURSE NO.** field is for the full course code, i.e. "PSYC1001A". The first four boxes are for letters, the next four are numbers, and the last is for the section letter (A, B, V…). CLEARLY PRINT course code and fill in the appropriate boxes below.

3) In the **DATE of EXAM** boxes, CLEARLY PRINT the date of the exam and fill in the appropriate boxes below.

4) The **STUDENT NUMBER** field has ten spaces, please be sure to start at the left and CLEARLY PRINT your entire student number, including the '100', i.e., 100123456. This is an essential, but unfortunately frequently forgotten piece of identification. Instructors using the WebCT Gradebook to post their students' grades online require the entire nine digit student number, otherwise uploading the grades to WebCT may be problematic.

5) The **EXAM VERSION NO.** is used to indicate which version of the exam the student is writing. If the instructor has handed out different versions of the exam (either different questions or a different order), the EXAM VERSION NO. must be filled in, or the exam cannot be graded. If there is only one version of the exam, leave this box blank.



edc 410 Dunton Tower. Carleton University, 1125 Colonel By Dr. Ottawa, Canada K1S-5B6;
Tel: 613.520.4433; Hours: 8:30 - 4:30 pm., Mon–Fri.; Email: edc@carleton.ca

Final Exam Questions

- Reporting, measurements, units, errors (L3-4) ~8
- Graphics, design (L5-L9) ~13
- Stats, regression, correlation (L11-15) ~20
- Linear systems, Matlab, Maple (L16-L19) ~13
- Departmental (L21-22) ~4
- Professionalism, OHS (L1, L23-24) ~7
- TSE (3-5, 7-9) ~15

- Total ~80

- Study lecture slides, associated textbook sections, review labs

Final Exam Formula Sheet

$$\mu = \frac{1}{N}\sum_{i=1}^{N} x_i \qquad \bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad \text{class mean} = \frac{\sum_{i=1}^{n} n_i CM_i}{\sum_{i=1}^{n} n_i}$$

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(x_i - \mu\right)^2} \qquad s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2} \qquad s_{\bar{x}} = \frac{s}{\sqrt{n}} \qquad \nu = n - 1$$

$$f(z) = \frac{1}{\sqrt{2\pi}}\exp\left(-\tfrac{1}{2}z^2\right) \text{ where } z = \frac{x - \mu}{\sigma}$$

Confidence interval for estimated population mean $= \bar{x} \pm z_c s_{\bar{x}}$ *for* $n > 30$

$$p = \bar{p} \pm z_c\sqrt{\frac{\bar{p}(1-\bar{p})}{n}} \text{ when } np > 5,\ n(1-p) > 5$$

$$e = y - \hat{y} \qquad SSE = \sum_{i=1}^{n} e_i^2 = \sum_{i=1}^{n}\left(y_i - \hat{y}_i\right)^2 \qquad \hat{y} = mx + b \qquad m = \frac{n\left(\sum_{i=1}^{n} x_i y_i\right) - \left(\sum_{i=1}^{n} x_i\right)\left(\sum_{i=1}^{n} y_i\right)}{n\left(\sum_{i=1}^{n} x^2\right) - \left(\sum_{i=1}^{n} x_i\right)^2}$$

$$b = \bar{y} - m\bar{x}$$

$$s_x = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2} \qquad s_y = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(y_i - \bar{y}\right)^2}$$

$$r = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)\left(y_i - \bar{y}\right)}{(n-1)s_x s_y} \qquad r = \frac{n\left(\sum_{i=1}^{n} x_i y_i\right) - \left(\sum_{i=1}^{n} x_i\right)\left(\sum_{i=1}^{n} y_i\right)}{\sqrt{n\left(\sum_{i=1}^{n} x^2\right) - \left(\sum_{i=1}^{n} x_i\right)^2}\sqrt{N\left(\sum_{i=1}^{n} y^2\right) - \left(\sum_{i=1}^{n} y_i\right)^2}}$$

$$TSS = SSR + SSE \qquad \sum\left(y - \bar{y}\right)^2 = \sum\left(\hat{y} - \bar{y}\right)^2 + \sum\left(y - \hat{y}\right)^2 \qquad r^2 = \frac{SSR}{TSS}$$

Final Exam

$$\|v\| = \sqrt{v_1^2 + v_2^2 + \ldots + v_n^2}$$

$$\frac{u \cdot v}{\|v\|} = \frac{\|u\|\|v\|}{\|v\|}\cos\theta = \|u\|\cos\theta$$

$$u \cdot v = \|u\|\|v\|\cos\theta \qquad u \cdot v = u_1v_1 + u_2v_2 + \ldots + u_nv_n$$

$$a \times b = c = \begin{bmatrix} a_2b_3 - a_3b_2 \\ a_3b_1 - a_1b_3 \\ a_1b_2 - a_2b_1 \end{bmatrix} \qquad \|c\| = \|a\|\|b\|\sin\theta$$

$z = \frac{x-\mu}{\sigma}$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4758	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4799	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4948	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.49865	0.4987	0.4987	0.4988	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990

z-statistic tables:
Area under the standard normal curve from 0 to z

Final Exam

t-statistic tables

υ	$t_{\upsilon,50}$	$t_{\upsilon,90}$	$t_{\upsilon,95}$	$t_{\upsilon,99}$
1	1.000	6.314	12.706	63.657
2	0.816	2.920	4.303	9.925
3	0.765	2.353	3.182	5.841
4	0.741	2.132	2.770	4.604
5	0.727	2.015	2.571	4.032
6	0.718	1.943	2.447	3.707
7	0.711	1.895	2.365	3.499
8	0.706	1.860	2.306	3.355
9	0.703	1.833	2.262	3.250
10	0.700	1.812	2.228	3.169
11	0.697	1.796	2.201	3.106
12	0.695	1.782	2.179	3.055
13	0.694	1.771	2.160	3.012
14	0.692	1.761	2.145	2.977
15	0.691	1.753	2.131	2.947
16	0.690	1.746	2.120	2.921
17	0.689	1.740	2.110	2.898
18	0.688	1.734	2.101	2.878
19	0.688	1.729	2.093	2.861
20	0.687	1.725	2.086	2.845
21	0.686	1.721	2.080	2.831
30	0.683	1.697	2.042	2.750
40	0.681	1.684	2.021	2.704
50	0.680	1.679	2.010	2.679
60	0.679	1.671	2.000	2.660
∞	0.674	1.645	1.960	2.576


That's All Folks