Course Outline

Instructor
Steve MacLeod

Office
Sessional Instructor Office
Email: stevemacster@gmail.com

Office Hours
Office Hours are by appointments. Please email me in advance.

Teaching Assistant
Darren O’Neill  darrenoneill@cmail.carleton.ca

Laboratory Technicians
Walter Zanetti  520-2600 x3554  walter.zanetti @carleton.ca
Jim Dewar  520-2600 x1939  jim.dewar @carleton.ca
Paul Durocher  520-2600 x2852  paul.durocher @carleton.ca

Time and Locations
Lecture: Thursday, 18:05 – 20:55, CB 3101 (Canal Building)
Lab Time: Thursday, 11:35– 14:25, 2493ME, 2143ARCH
(Metal Shop + Wood Shop)

Required Text Books
1. De Leeuw, Series and Mass Production Technologies for Product Design (Available at Harvest Books)
2. Kula, D., Materiology (Available at Amazon.ca)

Recommended Supplementary Books
Lefteri, C., Materials for Inspirational Design, covers inspirational innovative use of materials and processes. (Available at Amazon/Chapters web stores)

Lefteri, C., Making It, more general and visual in composition, but compliments de Leeuw’s book well if you have trouble with some of the technical references. (Available at Amazon/Chapters web stores)

Course Description:
Transformation techniques applied to manufacturing materials. Part-design requirements and cost factors for manufacturing processes. The influences and role of assembly, finishing, production tooling, costing are addressed.

Learning Outcomes:
By the end of this course, students will be able to:

1. Be familiar with main properties and characteristics of wood and wood joinery.
2. Demonstrate a process for comparing and contrasting different types of ferrous and non-ferrous materials in terms of performance characteristics particular to their intended use (corrosion, strength, appearance, weight, finishing, cost etc.)
3. Describe various forms of raw materials including metallic tubing, rod, pipe, sheet stock and ingots.
4. Describe sheet metal, casting and extrusion based metallic manufacturing processes in terms of part design, tooling, and raw material requirements.
5. Describe various means and requirements for punching and bending sheet metal.
6. Compare and contrast various metal manufacturing processes in terms of production quantity, quality and cost as a function of mass production volumes.

7. Describe the fundamental design requirements for tube bending and perform tube bending under safe supervision of professional technician.

8. Describe and perform basic machining operations including milling, turning and drilling, under the safe supervision of a professional technician.

9. Be familiar with main properties and characteristics of fabrics and sewing.

10. Be able to source fasteners for various assembly operations.

11. Describe the fundamental design requirements for metal casting.

12. Be aware of important life cycle issues in regards to metals, wood and fabrics.

13. Work as a team and use each other’s resources effectively.

14. Write a technical report.

15. Work safely in the lab under supervision by professional staff.

16. Describe a typical manufacturing facility.

**Labs:**
The laboratory work will consist of a number of projects intended to explore concepts, materials and technology as dealt with in the lecture portion of the course.

**Technical Lab 1**
The intent of the first lab is to gain experience working with a variety of materials and fabrication processes. Student groups will complete one of several projects involving wood and/or metal and fabrics.

**Technical Lab Report No.2/Presentation:**
The intent of the report is to explore a manufacturing processes and materials in product design. Students in groups will research, write and present to the class their results and submit a digital file and printed copy on the due date (see Schedule). This copy will be added to the school’s technical file. The research may be based on observations made during manufacturers’ visits.
# IDES 2101, Fall 2017 Schedule

<table>
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<tr>
<th>Week 1</th>
<th>Lecture</th>
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| Sept. 7 | Introduction + Assignment of Lab 1  
• Cutting and Bending Technologies  
• Materials Focus – Iron + Steel |  |
|         | Reading | Deleeuw Pg 39-44 and Chapter 12 pg 1-23 |  |
| Lecture |  |
|         | Design Intent / Mock ups for Lab 1 Review.  
• Shop demos on metal bending, wood working during the week.  
• Choosing materials and manufacturing in your workflow.  
• Introduction to draw forming. |  |
|         | Reading | Work on Lab Project 1 |  |
| Lecture |  |
|         | Sheet Forming, Drawing, and Pressing  
• Quiz 1 – Steel Alloys  
• Material Focus – Wrought Aluminum Alloys  
• Lab 1 Technician Sign Off |  |
|         | Reading | Deleeuw Chapter 12 pg 24-end |  |
| Lecture |  |
|         | Machining and Forming  
• Quiz 2 – Sheet Forming, Drawing, Pressing  
• Lab 1 Check. |  |
|         | Reading | Deleeuw Chapter 13+14 |  |
| Lecture |  |
|         | Expendable Mold Casting, Part 1  
• Quiz 3- Machining + Forming  
• Materials Focus – Bronze, Brass, Magnesium Alloys.  
• Lab 1 Project + Report Due |  |
|         | Reading | Deleeuw Chapter 15 |  |

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<th>Week 6</th>
<th>Lecture</th>
<th>Midterm</th>
<th>Mid Term</th>
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<tr>
<td>Oct. 12</td>
<td>Midterm</td>
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<tr>
<td>Lecture</td>
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|         | Permanent Mold Casting, Part 2  
• Materials Focus – Zinc Alloys  
• Lab 1 Report Due in Dropbox |  |
|         | Reading | Deleeuw Chapter 16 |  |

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<th>Week 8</th>
<th>Lecture</th>
<th>Winter Break</th>
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<td>Oct. 23-27</td>
<td>Break</td>
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<tr>
<td>Lecture</td>
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|         | Wood Products and Joinery in Woods  
• Quiz 4 – Wood Joints |  |
|         | Reading | Deleeuw Chapter 20 |  |
| Lecture |  |
|         | Fasteners, Adhesives, and Fabrics  
• Quiz 5 – Fasteners and Fabrics |  |
|         | Reading | Deleeuw Chapter 18 |  |
| Lecture |  |
|         | Ceramics and Glass  
• Quiz 6 – Glass + Ceramics |  |
|         | Reading | Deleeuw Chapter 19 |  |

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<th>Week 12</th>
<th>Lecture</th>
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<td>Nov. 23</td>
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| Lecture | Paints and Coatings  
• Materials Focus – Titanium, Nickel |  |

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<tr>
<th>Week 13</th>
<th>Present</th>
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<td>Nov. 30</td>
<td>Present</td>
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| Present | Presentations, Part 1  
Lab 2 due for all groups |  |

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<th>Week 14</th>
<th>Present</th>
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<tr>
<td>Dec. 7</td>
<td>Present</td>
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| Present | Presentations, Part 2  
Lab 2 |  |
Grading:
The course mark will be based on the term work as follows:

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<tr>
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<th>Exams</th>
<th>Lab. Exercises</th>
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<tr>
<td>Mid-term</td>
<td>20</td>
<td>Lab. no.1</td>
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<tr>
<td>Final</td>
<td>30</td>
<td>Lab. no.2</td>
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<td>Quizzes (6)</td>
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6% 24% 20% 50% + 50% = 100%

*Note:
- A passing grade must be attained in each of the exam and lab sections of the course in order to receive a passing grade on the course.
- The final exam is for evaluation purposes only and will not be returned to the student; however, it will be available for inspection upon request.

Individual/Group Work
Courses may include various combinations of individual and group work. Students must demonstrate individual aptitude, and achieve a passing grade for individual work, in order to pass the course. Where the evaluation for individual work is below a passing grade, that grade will be awarded for the course. It is important where collaborative work is undertaken that students be able to clearly demonstrate that individual contribution has been made.

Late Submission of Deliverables
All work (weekly assignments, reports, and others) submitted late will receive a 10% per day deduction from the determined grade, to a maximum of 3 days, from the original deadline time and date. Failure to submit material within 3 days, without approval from the instructor, will result in a grade of F.

Review Attendance
Attendance at scheduled project reviews is mandatory. Failure to attend and present, as scheduled, will result in a grade of F for the review and possibly on the project and course. If you are not able to attend a review, call the General Office (520-5672) and leave a message in advance. A medical certificate or other documentation to substantiate the absence must be submitted as soon as possible after the review. Such documentation must state the date of illness onset, the expected date of recovery, and the extent to which the student is incapacitated. A grade of F can be modified only if a student submits such documentation and completes the project requirements on a date agreed upon with the instructor. Arriving late for reviews, or not remaining for the complete session, without approval from the instructor, will result in a maximum grade of D+.

Instructional Offenses / Plagiarism
The regulations of the university require that we bring to your attention regulations on Instructional Offenses, descriptions of which can be found in the current Carleton University Undergraduate Calendar.

At the same time it seems that students do not always understand the meaning of plagiarism and how to avoid it. In industrial design, true and unique originality is difficult. Ideas and concepts come from a multitude of sources to be modified and utilized in the design and development process. A mature designer understands the need to seek out and acknowledges other successful solutions. The challenge for the student of industrial design is to learn how to develop this understanding.

Accommodations
You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)
Academic Accommodations for Students with Disabilities: The Paul Menton Centre provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable) at http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at http://www2.carleton.ca/equity/

Student Responsibility
The student is responsible for knowing the content of this course outline, the schedule of classes, assignments, and reviews; and material covered during any absence from scheduled classes.

Unless otherwise arranged, the class will meet during regularly scheduled class hours. These meetings are mandatory; important issues and questions will be raised, and announcements might be made. Everyone is expected to be based in class and to work during scheduled hours. Because of the special involvement of external professionals, scheduling changes for guest lectures, presentations, and reviews may occur at short notice; students should stay informed regularly.

Alterations to the Course Outline
The course outline may be subject to change in the event of extenuating circumstances. Every effort will be made to inform students in as timely a manner as possible.