McMaster University

Department of Materials Science & Engineering

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To: Undergraduate Students Returning to Programs in Materials Science & Engineering 2014-2015

From: Dr. Jeffrey Hoyt, Chair

Date: 3 June 2014

Ref: **IMPORTANT NOTES FOR RETURNING STUDENTS**

This memorandum contains important information and advice relating to courses and planning for Materials Engineering students in the next session. You are advised to file this document for ready reference throughout the coming year. A copy will also be placed on the MSE website, under the "Undergraduate" heading.

PART ONE: STUDENTS ENTERING LEVEL 2 MATERIALS ENGINEERING

Admission to Level II Engineering programs requires completion of all non-elective Engineering I courses with a minimum Cumulative Average (CA) of 4.0. All programs have limited enrolment; should there be more applicants than the limiting number in any program, admission to that program will be based on a points system, computed as the product of the Sessional Average (SA) and the number of units taken in the session (a minimum of 31 units will be used in the calculation). Students who do not meet the requirements to proceed to Level II in May will have a Pending flag put on their allocation. The Pending flag will be removed in August if the student completes the requirements over the summer.

In addition, admission to a B.Eng.Mgt. program requires the completion of ECON 1B03 with a minimum grade of 5.0; an interview may also be required.

Students admitted to a B.Eng.Society program are required to submit a statement indicating the educational objectives for the focus electives.

Students seeking admission to the Engineering and Management program, or the Engineering and Society program must first be admitted to the relevant department. Thereafter, they will be considered for admission to one of these two programs.

Engineering French Exchange Program

After completion of second year, Materials students have a unique opportunity to study and work in France for a period of 8 months. The student exchange agreement between McMaster and the Grenoble Institute of Technology is unique because it allows students to take courses in English. In addition, taking part in the exchange does not delay one's graduation. All participants are guaranteed a summer employment opportunity in France. To take part, apply during the first term of second year (the deadline is usually in October). For all the details see here.

PART TWO: STUDENTS ENTERING LEVEL 3 MATERIALS ENGINEERING

The Department of Materials Science and Engineering offers a common core with four specialized area of study in Levels III and IV. Students may complete the required units as listed in the calendar in Levels III and IV by choosing course selections according to the following specializations:

Electronic Materials	Polymers	Metallurgical	Nanomaterials
ENG PHYS 3PN4 (in Level 3) MATLS 3Q03 MATLS 4H03	CHEM ENG 3Q03 CHEM ENG 4X03 MATLS 4P03	MATLS 4D03 (in Level 3 or 4) MATLS 4C03 (in Level 4) MATLS 4I03 (in Level 4)	MATLS 3Q03 MATLS 4FF3 MATLS 4G03, 4H03 (3 UNITS)

Other interest areas, such as **Biomaterials**, are also possible, and the Calendar should be consulted for appropriate courses, such as Chem Eng 4T03 and Eng Phys 3X03.

Note that a course in a specialization may not be taught when the enrollment is (expected to be) too low.

As well as completing the academic requirements as specified in this Calendar, students in a Co-op program must complete ENGINEER 1EE0.

Here is a summary of the planned offering of Materials technical elective courses in the coming years.

Please take note that not every elective is offered in every academic year. This allows the department to offer a wider range of electives but makes it **essential that you plan carefully** to make sure you can take all your first choice electives.

Course	2013-2014	2014-2015	2015-2016
MATLS 3Q03 Materials for Electronic Applications	Term 2	Term 2	Term 2
MATLS 4C03 Modern Iron and Steelmaking	Not Offered	Term 2	Not Offered
MATLS 4D03 Materials and the Environment	Not Offered	Term 1	Not Offered
MATLS 4FF3 Synthesis, Applications and Environmental Impact of Nanomaterials	Term 2	Term 2	Term 2
MATLS 4G03 Characterization of Nanomaterials	Not Offered	Term 1	Not Offered
MATLS 4H03 Thin Films Science and Engineering	Term 1	Not Offered	Term 1
MATLS 4I03 Sustainable Manufacturing Process	Term 2	Term 1	Term 2
MATLS 4K06 Senior Thesis	Term 3	Term 3	Term 3
MATLS 4N03 Hydrogen, Solar and Nuclear Materials	Not Offered	Term 1	Not Offered
MATLS 4NN3 Computational Modeling in Materials Eng.	Term 2	Not Offered	Term 2
MATLS 4P03 Properties of Polymeric Materials	Term 1	Not Offered	Term 1
MATLS 4R03 Ceramic Science	Term 1	Not Offered	Term 1
MATLS 4T03 Properties and Processing of Composites	Term 2	Not Offered	Term 2

Materials Engineering Co-op Program

In recent years a number of Materials Engineering students have found successful placements in the Co-op Program. For the right student the experience can be rewarding and of positive benefit to their undergraduate studies and comprehension of curricular topics. Employers have also expressed a preference for hiring students with this kind of experience. Details of the program are available on the Engineering Co-op and Career Services website at: http://www.eng.mcmaster.ca/eccs/index.html

PART THREE: FOR STUDENTS ENTERING THE FINAL LEVEL OF MATERIALS ENGINEERING PROGRAMS

ENG 4M06 Multidisiplinary Projects

Students can take ENG 4M06 in place of MATLS 4Z06. 4M06 is a Capstone Course in which students work with students from several engineering disciplines to develop an integrated design or solve a problem for an organization (company or not-for-profit organization). Two Labs (3 hours each); both terms. Prerequisite(s): Registration in final year of an Engineering program, a CA of at least 8.0, and permission of Department and Instructor. Antirequisite: MATLS 4Z06

The course outline and slides from a presentation on the course can be found at:
http://www.eng.mcmaster.ca/current/current_students.html

Employment and the Possibility of Graduate Studies

We realize full well that by March in the final year most students never want to hear another lecture, or do an assignment ever again. However, there are a wide variety of opportunities beyond the undergraduate degree.

It is useful to consider very early in the academic year whether you may be interested in staying on in a graduate program either as a full-time student, a part-time student or as a co-operative student doing some portion of the research work in industry. If you believe graduate school might appeal to you, then feel free to discuss the possibility with faculty whose research interests align with yours. Applications are due by March 1st. Keep in mind you will receive a salary during graduate studies. Also bear in mind that the emphasis of graduate study is thesis lab work and not lecture courses.

Grad scholarships are available to outstanding students. The due dates for graduate scholarships are in October or November.

If you have questions concerning the possibilities of doing graduate work, feel free to talk to our Graduate Studies advisor Dr. Adrian Kitai, or any of the faculty. The department has a strong international reputation for its research work and it is a great pity that often undergraduates do not see the scope and potential of the work which is encompassed in the graduate programs. We certainly hope that some of you will consider graduate work because the need for scientific and technological leadership in Canada has never been greater and can only be met by people who have sound research training.

For those students interested in pursuing industrial employment, keep in mind it is useful to discuss careers with MSE faculty members when you have the opportunity. Many faculty members have considerable experience of the materials industries and can provide useful guidance.

We sincerely hope you will find the next year challenging and interesting. It should provide you with the opportunity for a more individualistic approach to your studies, a chance to evaluate your own motivation and to develop your skills and interests. MSE is still a relatively small department and you should feel that there is time for you to discuss topics with the faculty and research staff. They can provide you, not only with knowledge related to your courses, but guidance with careers and a broader view of materials science and engineering. We hope you have a very happy, enjoyable and rewarding summer and look forward to seeing you in September.

Please note:

Students entering Level II should register in the Materials Science and Engineering program and follow the requirements outlined below.

Students entering Levels III, IV or V should follow the program requirements as specified in the Undergraduate Calendar of the year of their entry into Level II. Such students are advised to refer to their degree audit for the program in which they are registered and to consult with the Department of Materials Science and Engineering for further information.

Please see the complete undergraduate calendar at:

MSE Undergraduate Calendar

Materials Engineering (B.Eng.)

Requirements

Level II: 36 Units 3 units CHEM 1AA3 - Introductory Chemistry II 4 units CHEM ENG 2O04 - Fluid Mechanics 7 units ENGINEER 2MM3 - Electrical Circuits and Power ENGINEER 2P04 - Engineering Mechanics 'A' 13 units MATLS 2B03 - Thermodynamics of Materials MATLS 2D03 - Solution Thermodynamics MATLS 2H04 - Measurements and Communication MATLS 2X03 - Crystalline Structure of Materials 6 units MATH 2Z03 - Engineering Mathematics III MATH 2ZZ3 - Engineering Mathematics IV 3 units approved complementary studies electives	**Level III: 36-38 Units** 3 units ENGINEER 2B03 - Engineering Economics 24 units MATLS 3B03 - Materials Production MATLS 3C04 - Thermodynamics of Multicomponent Systems MATLS 3E04 - Mass Transfer MATLS 3F03 - High-Temperature Materials Production MATLS 3J03 - Statistical Methods for Materials Engineers MATLS 3M03 - Mechanical Behaviour of Materials MATLS 3T04 - Phase Transformations 9-11 units approved Level III or IV technical electives, which must include CHEM ENG 3A04 if not completed (See Note 1 for streaming option.)
Level IV: 35-36 Units 10 units ENGINEER 4A03 - Sustainability and Ethics in Engineering ENGINEER 4J03 - Materials Fabrication ENGINEER 4T04 - Materials Selection in Design and Manufacturing 13 units MATLS 4I03 - Sustainable Manufacturing Processes MATLS 4L04 - Materials Manufacturing MATLS 4Z06 - Industrial Projects (See Note 3) 6 units approved complementary studies electives 6-7 units approved Level III or IV technical electives, which must include CHEM ENG 3A04 if not completed (See Note 1 for streaming option.)	

Materials Engineering Co-Op (B.Eng.)

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Materials Engineering and Management (B.Eng.Mgt.)

Level V Materials Engineering and Management students interested in completing the Entrepreneurship Stream must apply to the Engineering and Management Program Office.

Requirements

Level II: 33 Units 3 units COMMERCE 2MA3 - Introduction to Marketing 6 units ECON 1BB3 - Introductory Macroeconomics ECON 2X03 - Applied Business Economics 2 units ENGN MGT 2AA2 - Communication Skills 3 units ENGINEER 2MM3 - Electrical Circuits and Power 6 units MATH 2Z03 - Engineering Mathematics III MATH 2ZZ3 - Engineering Mathematics IV 13 units MATLS 2B03 - Thermodynamics of Materials MATLS 2D03 - Solution Thermodynamics MATLS 2H04 - Measurements and Communication MATLS 2X03 - Crystalline Structure of Materials	**Level III: 37-38 Units** 4 units CHEM ENG 2O04 - Fluid Mechanics 3 units CHEM 1AA3 - Introductory Chemistry II 9 units COMMERCE 1AA3 - Financial Accounting I (or 2AA3) COMMERCE 1BA3 - Organizational Behaviour (or 2BA3) COMMERCE 2FA3 - Introduction to Finance 4 units ENGINEER 2P04 - Engineering Mechanics 'A' 14 units MATLS 3C04 - Thermodynamics of Multicomponent Systems MATLS 3F03 - High-Temperature Materials Production MATLS 3J03 - Statistical Methods for Materials Engineers MATLS 3T04 - Phase Transformations 3-4 units approved Level III or IV technical electives
Level IV: 38-39 Units 4 units CHEM ENG 3A04 - Heat Transfer 12 units COMMERCE 2AB3 - Managerial Accounting I COMMERCE 2BC3 - Human Resource Management and Labour Relations COMMERCE 3FA3 - Managerial Finance COMMERCE 3MC3 - Applied Marketing Management 3 units ENGINEER 4A03 - Sustainability and Ethics in Engineering 3 units ENGN MGT 4A03 - Innovation Driven Project Development and Management 10 units MATLS 3B03 - Materials Production MATLS 3E04 - Mass Transfer MATLS 3M03 - Mechanical Behaviour of Materials 3 units approved complementary studies electives 3-4 units approved Level III or IV technical electives	**Level V: 35 Units** 6 units COMMERCE 4PA3 - Business Policy: Strategic Management COMMERCE 4QA3 - Operations Modelling and Analysis 7 units ENGINEER 4J03 - Materials Fabrication ENGINEER 4T04 - Materials Selection in Design and Manufacturing 13 units MATLS 4I03 - Sustainable Manufacturing Processes MATLS 4L04 - Materials Manufacturing MATLS 4Z06 - Industrial Projects (See Note 1.) 3 units ENGN MGT 5B03 - Engineering and Management Projects or ENGN MGT 5EP3 - New Enterprise Capstone Project (for Entrepreneurship Stream) 6 units Commerce electives selected from Level III or IV Commerce or ENGN MGT 5E03 - Entrepreneurial Processes and Skills ENGN MGT 5EE3 - Breakthrough Technology Venture Development (for Entrepreneurship Stream)

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Materials Engineering and International Studies (B.Eng.Society)

Entry into the International Studies program will no longer be available as of 2013-2014 academic year. Students currently enrolled in the program will be able to complete the program requirements.
A minimum of 18 units of focus elective courses is required for the program. (This does not include the six units of complementary studies elective in Level I.)
As well as completing the academic requirements as specified in this Calendar, students in a Co-op program must complete ENGINEER 1EE0.
International Studies Focus Electives Option: Students may choose to follow a set of recommended focus electives: ANTHROP 1AB3, RELIG ST 1B06, POL SCI 2M03, POL SCI 2XX3, 3 units Focus Electives

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