EP.06.26
(Rev. 2/7/06)

PROPOSAL TO THE SENATE COMMITTEE ON EDUCATIONAL POLICY

TITLE OF THE PROPOSAL: M.S.(Ph.D.)/M.B.A. Joint Degree Program between the Department of Materials Science and Engineering and the MBA Program in the College of Business.

SPONSORS: Phillip H. Geil, Associate Head, Department of Materials Science and Engineering, 217-333-0149, geil@uiuc.edu, and Larry DeBrock, Associate Dean for Professional Programs, College of Business, 217-333-4553, ldebrock@uiuc.edu

BRIEF DESCRIPTION: Establishment of a joint M.S./M.B.A. (and Ph.D./M.B.A.) program is proposed. Students would have to satisfy all of the requirements for admission to both the MatSE department and the M.B.A. Program. Students would complete the regular requirements for the MatSE M.S. or Ph.D. degree. In addition, students would take 3 semesters of MBA courses as a full-time student, completing 60 hours of M.B.A. coursework; if students pursued both degrees separately, it would take four semesters to complete the M.B.A. degree Further details are given in the Statement for Programs of Study Booklet.

JUSTIFICATION: Many graduate students in MatSE become involved in the management aspects of companies following graduation. The proposed joint degree permits them to obtain appropriate training in business so that they will be able to more effectively contribute. Materials Engineering focuses on the synthesis of materials in useful quantities, and on the processing of component materials into engineering products. Basic studies frequently find ways to improve the properties of materials, and goal-oriented engineering often reveals aspects of performance that challenge the basic understanding. Business does much the same thing as it applies to organizations and business processes.

The joint degree is most appropriate for individuals who have an interest in combining entrepreneurial interests and modeling/statistics with business processes and applications. A joint degree will enable the engineering students to acquire business knowledge and skill, but will also allow the MBA program to benefit from students who have a strong technical background in statistics, analysis, and process. Materials science students in the MBA program who desire to pursue a secondary concentration outside the MBA program may work with the MBA program adviser and their MatSE advisor to develop an individualized program plan that would allow them to take coursework in statistical analysis and materials sciences, such as:

MSE 500 Statistical Thermodynamics of Materials presents the atomistic concepts of statistical thermodynamics and shows its relationship to classical phenomenological thermodynamics. Applies the methods of statistical thermodynamics and statistical mechanics to describe the properties of a variety of materials, especially ceramics, polymers, electronic materials and metals.

CHEM 544 Statistical Thermodynamics studies the fundamentals of classical thermodynamics with emphasis on equilibrium and stability criteria with discussion of several ensembles and applications to ideal systems of interest to chemists.

PHYS 504 Statistical Physics studies the single-particle distribution functions; classical and quantum mechanical systems, Boltzmann equation, virial theorem, and equations of state for gases

MSE 586 Selection of Materials Broad comparative study of the mechanical, thermal and chemical properties of all classes of materials (metals, polymers, ceramics, and composites); formal theory, non-equilibrium problems, conservation laws and hydrodynamic equations, sound waves and transport coefficient.

In addition, typical courses taken by Materials Science students involve various aspects of manufacturing and bringing products to market. Obvious examples include MSE 453 Plastics Engineering and 470 Design and Use of Biomaterials. In both courses students are required to design a new or improved product, describe benchmarks, appropriate material and manufacturability, predict cost and present the project to classmates. In MSE 470 they are also required to prepare a report in the form to be presented to management. (Further complementary courses are listed in the Appendix at the end of this proposal.)

While the courses in materials engineering are very technical, the processes and application are transferable to business and economic analysis. Joint degree students are encourage to apply their specific knowledge to OSBI Consulting and Center for Entrepreneurial Development (CED) projects and activities, as well as assisting the Office of Technology Management (OTM) with analysis and evaluation of commercialization of new technologies.

Therefore, a joint program will permit these students to accomplish their objectives more efficiently and effectively. In addition, those MatSE students taking the non-thesis M.S. degree will be strongly encouraged to obtain a summer internship following the first year of the MBA program, similar to regular M.B.A. students. MatSE students in the thesis program can obtain an internship if they wish, or choose to be involved in an OSBI Consulting or CED project, or contribute in some way to other opportunities on campus that combine the need for technical expertise and business knowledge and analysis before they graduate. Although the other joint degree programs in the College of Engineering are restricted to M.S./M.B.A., we expect some MatSE Ph.D. students to have a similar desire for business experience. Most of our Ph.D. students will proceed directly to the Ph.D. without obtaining an M.S. first. Hence we also propose a joint Ph.D./M.B.A. degree.

If accepted into this program, students could also obtain the M.S./M.B.A. degrees first and then continue for the Ph.D. The joint degree program reduces the credit hour requirements for the M.B.A by 12 hours, normally used for 3 electives or part of a second concentration. This is compensated for, in part, by the combination of courses and other activities mentioned previously. In addition, the MatSE course work (and thesis) requires considerable knowledge in the area of information technology, one of the MBA concentrations.

BUDGETARY AND STAFF IMPLICATIONS: None. Both MatSE and the M.B.A. Program are expected to admit the same number of students as at present. The only change would be that a few of the M.B.A. students (estimated to be 2-3/year) would be from MatSE. The presence of the joint M.S./M.B.A. program may permit us to recruit a few more non-thesis M.S. students; these can be readily included in current MatSE courses.

PROPOSED EFFECTIVE DATE: Fall 2006

CLEARANCES:

_____ Date 09/08/05
Department of Materials Science and Engineering

_____ Date 09/06/05
MBA Program Larry DeBrock

_____ Date 9/6/05
College of Engineering

_____ Date 09/06/05
College of Business Avijit Ghosh

_____ Date _____
Graduate College

_____ Date _____
Office of the Provost

STATEMENT FOR PROGRAMS OF STUDY BOOKLET

M.S./M.B.A., Ph.D./M.B.A Program

The Department of Materials Science and Engineering and the MBA Program in the College of Business have jointly established a program leading to the degrees of Master of Science or Doctor of Philosophy in Materials Science and Engineering and Master of Business Administration.

Students interested in earning the two degrees jointly must meet the admission standards of the Graduate College and must be accepted by both programs. The MatSE Department and the MBA Program each maintain separate control over their admissions, programs, and degree awards. However, the degrees are awarded simultaneously after the requirements of both degree programs have been met. At any time, the student is enrolled in one or the other degree program, and must transfer from one program to the other via a petition to the Graduate College.

The MatSE M.S. and Ph.D. degree requirements are the same as for all students. All of these requirements must be satisfied. Registration in MSE 595 is required while enrolled in the M.S. program and the first 2 years of the Ph.D. program. As stated in the M.S. degree program requirements, a student enrolled in the thesis option must earn 32 hours of graduate level credit, including 12 500-level credits (including 8 hours of thesis credit in MSE 599) and 8 hours of MSE courses. A student enrolled in the M.S. non-thesis option must earn 36 hours of graduate level credit, including the 12 hours of 500 level credit and 8 hours of MSE courses. Students in the non-thesis option are strongly encouraged to obtain an internship during the summer after their first year in the M.B.A. portion of the program, similar to students in the regular MBA Program. Students enrolled in the Ph.D. program need 44 hours of course work and 52 hours of thesis work, including 4 hours of MSE 500 (or equivalent) and 4 hours of MSE 595. The three semesters dedicated to the M.B.A. portion of the joint degree program can be taken at any time during the MatSE Ph.D. program. For more details see http://www.mse.uiuc.edu/info/gradindex.html

To complete the M.B.A. part of the joint degree, students must register as a full-time M.B.A. student for three semesters and complete 60 hours of the following coursework, described in more detail below:
1. MBA 500, 501, 502, 503, 504 and 8 hours of MBA 505 in the first year of the M.B.A. program, which totals 40 hours.

2. A designated concentration (16 hours) and 4 hours of elective.

There are two phases of the joint M.S. MatSE/M.B.A. program. The first-year Illinois M.B.A. core program consists of four integrated seven-week modules and two one-week Applying Business Perspectives Seminars.

Module 1 (First Semester, 1st 8 weeks)
MBA 500 (0 hours) Issues in Business
MBA 501 (10 hours) Foundations of Business I

Module 2 (First Semester, 2nd 8 weeks)
MBA 502 (10 hours) Foundations of Business II
Includes ABP I : Applied Business Perspectives Seminar

Module 3 (Second Semester, 1st 8 weeks)
MBA 503 (6 hours) Principles and Processes of Management I
Includes ABP II: Applied Business Perspectives Seminar

MBA 505 (4 hours) Topics in Management - Choose two topics during this module

Module 4 (Second Semester, 2nd 8 weeks)
MBA 504 (6 hours) Principles and Processes of Management II
MBA 505 (4 hours) Topics in Management - Choose two topics during this module.

After completing their first year in the MBA program, students take at least 16 credits of approved business courses to fulfill the requirements of a professional concentration (Finance, Marketing, Information Technology, Operations Management, and General Management) plus an additional 4 hour elective. Complete details can be obtained from either department.

Students may decide to apply to the joint program after already enrolling in one of the two departments. In that case, they should notify both departments during their first semester in residence to inquire on application procedures, which are different than previously stated. Students may not apply to the joint program if they have already completed all requirements for either degree. While enrolled in the MatSE program, students will be eligible for Research and/or Teaching Assistantships; students enrolled in the MBA program ordinarily are not eligible for support. Thesis research can be conducted during the summer between the 2nd and 3rd semester of the MBA program, but likely would be significantly limited during the academic semesters. Students would be expected to remain associated with their research groups throughout the program; this would entail non-course-related activities such as meeting with one's research group, spending time in the research group office, etc. As indicated above, non-thesis MatSE M.S. students are strongly encouraged to obtain an internship during this summer, similar to those obtained by regular M.B.A. students; thesis M.S. and Ph.D students may also participate in such an internship if they wish. In lieu of an internship, thesis students can also be involved in an OSBI Consulting or CED project, or contribute in some way to other opportunities on campus that combine the need for technical expertise and business knowledge and analysis before they graduate.

Appendix: Further Complementary Courses in MatSE

421. Cer Proc & Microstruc Devel. 3 OR 4 hours. Basic principles and understanding of microstructure development and processing of ceramic materials will be addressed, with an emphasis on structure-property-processing relationships. Knowledge of a variety of processing methodologies and their effects on microstructural development will be gained. Examples of several ceramic components will be illustrated and discussed within this context

424. Refractory Technology. 3 OR 4 hours. Engineering properties and thermochemistry of polycrystalline materials for use at elevated temperatures including processing of raw materials and the manufacture, heat treatment, quality control, and specification of refractory products; particular emphasis on oxides, silicates, carbides, borides, cermets, and refractory metals with a correlation of the properties of those materials to certain design criteria

441. Metals Processing. 3 hours. Discussion of melt, mechanical, thermal, powder and surface processing of metals. Extraction of metals, joining of metals, metal composites and metal recycling are also reviewed. The relationships between the processing of metals, the microstructures that are produced and the behavior of metal components are emphasized.

460. Electronic Matls & Proc, I. 3 hours. Introduces senior engineers and new graduate students to the materials science, engineering, and processing of semiconductors. The structure and chemistry of semiconductors are related to the electronic and optical properties. Includes: how semiconductors are produced and how to control processing to achieve desired materials properties; how to design and produce novel materials to obtain superior performance from electronic device.

461. Electronic Matls & Proc, II. 3 hours. Introduction to the materials science, engineering, and processing of microlithographic materials, conductors and dielectrics for electronic applications. The course makes use of the concepts developed in materials science to understand why certain materials make acceptable contacts and dielectrics while others do not. Demonstrates how manufacturing problems can be overcome with careful materials design and processing. Examines some of the processing techniques commonly used in microelectronic circuit manufacture during metallization, dielectric formation and lithography.

484. Composite Materials. 3 OR 4 hours. Introduction to metal and ceramic matrix composites, with an emphasis on understanding the interrelationships between processing, microstructure and properties. The basis for selecting these systems for different engineering applications is considered