Proposal

For an

Accelerated Bachelor's/Master's in Engineering Programs

University of the District of Columbia

College of Engineering and Applied Sciences

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Accelerated Bachelor's/Master's in Engineering Programs

Executive Summary

The College of Engineering and Applies Sciences (SEAS) at the University of the District of Columbia proposes the establishment of an **accelerated path** between its Bachelor's degree and its Master's degree program in each of its engineering departments. In our highly technical and globally competitive society, a Master's degree is frequently viewed as the "working degree" for many engineers. The accelerated Bachelors/Master's (ABM) program affords outstanding undergraduate student at each engineering department, who wish to continue their studies toward a master's degree at that department, the opportunity to broaden their studies, improve their career prospects and competitive advantage in the marketplace, and to complete the requirements for both the bachelor's and master's degrees at an accelerated pace (typically within five years). Undergraduate students admitted to the ABM program may take up to 12 graduate-level credits (four 500-600 level courses) prior to admission to the Master's program. Six of these graduate-level credits may be double counted towards both the bachelor's and master's degree requirements. The six double-counted credits must be used fulfill the technical elective requirements of the bachelor's degree. The other six graduate-level credits may be applied toward the master's degree if and only if these credits were not used to fulfill the requirements of the bachelor's degree. Double counted credits must be recommended by the student's academic advisor and approved by the graduate program director and the department chair. For each of the graduate courses counted as credits for both BS and MS degree, a minimum grade of "B" is required. Students admitted to the ABM program can complete the requirements for the Master's degree within at most three semesters after obtaining the Bachelor's degree. Similar programs currently exist in several other institutions in the nation including the University of Maryland (college park), George Washington University, and George Mason University. A list of some of these institutions and a link to their programs is given in Appendix A.

By the nature of its structure, the program will require undergraduate students to make an early commitment to graduate studies; thereby raising the odds that highly motivated students will enter the program. It is important to note that permission to pursue the ABM path does not guarantee an admission to the Graduate School. Admission is contingent on meeting all eligibility requirements at the time of entering the graduate program. Graduate course taken prior to admission to the Master's program will be designated as applicable to the graduate program of study after the student receives the bachelor's degree and enrolls in the Master's degree program.

The proposed program will also benefit the Master's programs by adding an extra channel for recruitment. The caliber of student recruited is likely to be superior, since they would have demonstrated an early commitment to the pursuit of a graduate degree and maintained a good academic record. Therefore, the availability of the accelerated degree program will enhance the quality of SEAS graduate programs; raise marketability of prospective students, and increase recruitment and retention of students.

Successful implementation of the ABM program at the SEAS can provide a model example for other departments at UDC to design and implement such a program in order to increase the number of applicants applying for their undergraduate programs which can lead to improving the overall quality of UDC programs.

Description of the Program

The ABM program is intended for highly motivated and qualified undergraduate students who wish to pursue an advanced degree. Undergraduate Students admitted to the program may, in the senior year, Undergraduate students admitted to the ABM program may take up to 12 graduate-level credits (four 500-600 level courses) prior to admission to the Master's program. Six of these graduate-level credits may be double counted towards both the bachelor's and master's degree requirements. The six double-counted credits must be used fulfill the technical elective requirements of the bachelor's degree. The other six graduate-level credits may be applied toward the master's degree if and only if these credits were not used to fulfill the requirements of the bachelor's degree. Double counted credits must be recommended by the student's academic advisor and approved by the graduate program director and the department chair. For each of the graduate courses counted as credits for both BS and MS degree, a minimum grade of "B" is required.

Accelerated BS/MS programs offer greater flexibility to the student to schedule courses so as to complete prerequisites for advanced study. A seamless transition to Master's degree gives students an opportunity to complete the requirements for Master's degree programs in three semesters after completing the requirements for the Bachelor's degree; thus improving the efficiency of the students' use of their college times and experiences. ABM programs also improve the efficiency of resources utilization for departments offering such programs.

The ABM program at SESA engineering departments can provide exceptional students in these departments with the following benefits and opportunities:

- Opportunity to finish their Master's degree requirements in approximately 3 semesters after finishing the requirements for the bachelor's degree. Many employers are favoring applicants with the additional education and experience implied by the MS degree.Typical salaries for students with M.S. degrees are about 25% higher than those with B.S. degrees.
- Opportunity to broaden their studies and improve their competitive advantage and career prospects.
- Greater flexibility to schedule courses so as to complete prerequisites for advanced study.
- Opportunity to plan their courses of study better. This makes possible a more streamlined set of courses, and allows better balance between depth and breadth.
- Opportunity to get a Master's degree seamlessly, knowing that the advanced courses they will be taking have been designed to have the exact prerequisites they have taken as undergraduates.

- The shorter BS/MS term provide students with an efficient use of their college time and experience. For students in this program, up to 6 graduate-level credits taken in fulfillment of the BS requirement can be counted twice, once for the BS and once for the MS. They can also take additional two graduate-level classes in their senior year, and have them count only towards the Master's degree program. Undergraduate students gain research experience by working with research faculty in their internally and externally-funded projects.

The implementation of the ABM program can also improve the efficiency of resources utilization for all SEAS engineering departments. The implementation of the ABM program can help attract more students to the undergraduate program and increases the pool of qualified students from which the Master's program can recruit. Increasing the number of students in both the undergraduate and graduate programs will help improve resource utilization and reduce the costs of teaching and research per student in the college.

A. Admission Requirements

Students will be admitted to SEAS engineering department under the guidelines that currently exist for admitting traditional BS students. The sequence of courses that they will take for the first three years will be identical to the courses taken by traditional Bachelor's degree majors. The students will be made aware of the option to pursue the accelerated program during their first year, and counseled appropriately if they wish to pursue it. Interested undergraduate student will generally apply for the accelerated program at the beginning of their second semester of their junior year. Students applying for entry into the ABM degree program must meet the following criteria:

- Rank of Junior at the time of application.
- A minimum of 80 semester credit hours completed (typically at the end of the fifth semester of undergraduate study) at the time of submitting an application including nine credits of 300-level coursework required by their undergraduate program.
- A cumulative GPA of 3.2 or higher at the time of submitting an application.
- Transfer students must have completed a minimum of two semesters as a full-time student at UDC, a minimum of 30 hours.

Typically, this means that student will submit application in the Sixth semester of the Bachelor Program (usually the spring term of the junior year).

Students may also be admitted to the ABM program via a nomination process. A faculty member may nominate a student with a cumulative GPA between 3.0 and 3.2. A memo of nomination must be submitted that includes justification for considering the candidate. The candidate must submit the normally required application information.

In addition, a student applying to the ABM program must also have a faculty advisor with whom he/she must consult to compose a program of study, including a list of courses to be taken from the senior year through the end of the Master's program. The faculty advisor must also serve as a

reference for the joint BS/MS degree program application. The program of study must be approved by the faculty adviser, the graduate program director, and the department chair before being submitted as part of the application.

B. Required application materials:

Applications to the accelerated BS/MS program includes: a) Completed application form; b) Statement of purpose explaining motivation for graduate study; c) Unofficial UDC transcript; d) Three letters of recommendation, two of which must be from the department faculty; and e) Approved program of study. The Specific due date for application will be posted in the department web site.

C. Continuation in the Program

The student must maintain a GPA of at least 3.2 over all undergraduate courses taken, and a GPA of at least 3.0 in all graduate courses taken in order to remain in good standing in the program. If a student's GPA drops below 3.2, the student will be placed on academic probation within the program for one semester. If the student raises their GPA to 3.2 or higher, he or she will be removed from probation and returned to good status to the program. If after one semester the student is not able to raise their GPA sufficiently, she/he will be removed from the ABM program.

D. Opt-Out Option

A student may withdraw at any time from the ABM program, by informing the Director of the Graduate programs in writing. A copy of this request must be sent to the Graduate School. A student who either desires to withdraw or is denied continuation in the ABM program will nonetheless be able to complete the traditional BSEE in four years. In that case, the graduate courses taken through the end of the senior year fall semester are counted as technical electives towards the BS degree. Graduate course credits used for the undergraduate degree cannot be used toward the graduate degree at a later date.

E. Enrolling in the Master's Degree Program

It is important to note that permission to pursue the ABM path does not guarantee an admission to the Master's degree program in his/her deperment. Admission is contingent on meeting all eligibility requirements at the time of entering the graduate program. Graduate course taken prior to admission to the Master's program will be designated as applicable to the graduate program of study after the student receives the bachelor's degree and enrolls in the Master's degree program.

F. **Program Administration**

The Chair of each engineering department, assisted by the Director of the Graduate Studies in that department, will be responsible for the implementation and administration of the ABM Program in that department. All requirements in the program will be in compliance with accreditation requirements of the Bachelor of Science program, and the Graduate Studies Requirements of the Academic Policies of the University. The graduate committee at each

engineering department will be responsible for developing or modifying the academic polices of the ABM program and for periodic review of its requirements.

Justification and Need

The U.S has been the leader in engineering science and technology since the World War II. However, such dominant position is now being challenged by other nations. For the recent years, China and India have graduated several times more engineers than the U.S., thus reducing the number of talented foreign students studying in the U.S. As a result it is imperative to attract more domestic students to engineering programs, especially at the graduate level since the percentage of the domestic (U.S. citizens) engineering graduate students is very low. One of the reasons is most domestic undergraduate students in engineering do not continue to pursue advanced graduate engineering degree after graduation due to their job opportunities. The proposed ABM in the engineering department at SEAS provides incentive to those high quality undergraduates to complete both degrees in relatively shorter time period.

The implementation of the ABM will also allow UDC to compete, in recruiting talented students, with the ever-growing number of universities throughout the United States offering similar programs in a wide verity of STEM disciplines. Examples of such universities include the University of Maryland at College Park, George Mason University, Georgia Institute of Technology, Old Dominion University, the University of Tennessee at Knoxville, North Carolina State University, Ohio State University, and Drexel University. For many universities, the availability of accelerated programs is used a marketing tool to attract larger number of applicants to their undergraduate programs. Most electrical engineering departments offering such a program double count 6 – 12 credit hours towards the requirement of both the BS and MS degrees. A list of some of these institutions and a link to their programs is given in Appendix A.

The implementation of the ABM program can also improve the efficiency of resources utilization for the SEAS engineering departments. Successful implementation of the ABM program can help attract more students to the undergraduate program and increases the pool of qualified students from which the Master's degree program can recruit. Increasing the number of students in both the undergraduate and graduate programs will help improve resource utilization and lower the costs of teaching and research per student graduated in the department.

Successful implementation of the ABM program at SEAS engineering departments can provide a model example for other departments at UDC to design and implement such a program in order to increase the number of applicants applying for their undergraduate programs which can lead to improving the overall quality of UDC programs.

Congruence with University Mission

UDC has a strong commitment to teaching and research. The published UDC mission statement regarding its academic programs states, "… These programs will prepare students for immediate entry into the workforce, for the next level of education, for specialized employment

opportunities, and for lifelong learning." Consistent with this mission, the proposed program will provide students with additional depth and breadth beyond the bachelor's degree and the opportunity to do supervised research, and to receive two degrees in a shorter time than would take to pursue the degree separately. Students who complete the program will have higher credential and be able to contribute more quickly and effectively to their employer's mission. Such an innovative program is important for attracting domestic students to graduate studies, especially from the DC metropolitan area.

Avoidance of Duplication or Overlap with Other Programs

The proposed ABM path is not a duplicate of any existing program at the University of the District of Columbia.

Relationship with Other Programs/Department

The proposed ABM program will complement and help strengthen Master's degree programs at SEAS. It will also complement and help strengthen other graduate programs in the university such as the Master of Science in Computer Science, among others, through collaboration in multidisciplinary research activities.

Effect of Student/ University Development

The advancements in the engineering profession require successful engineers to have additional breadth and depth beyond the bachelor's degree. Many employers are favoring applicants with the additional education and experience implied by the Master's degree. In many STEM disciplines, The Master's degree is slowly becoming the entry level degree into the profession. The ABM program seamlessly followed by a Master's degree program will help reduces the cost of both degrees and enhances student marketability for career advancement. Engineers who have completed the M.S. degree generally enter the work force with higher starting salaries and a wider range of career opportunities from which to choose. They also tend to be promoted sooner than those who have not completed graduate level degrees.

Graduate students are the main workforce in research activities. Increasing the number of students admitted to the AMB and the Master's degree programs will help enhance the quality of the research conducted by the faculty. This is essential for applying to research grants from sources such as the National Science Foundation (NSF), The Department of Education (DOE), the Department of Defense (DoD) to list a few.

Adequacy and Qualifications of Current Faculty and Support Staff

The faculty of the engineering departments at SEAS has the highest qualifications needed for their profession. Each faculty has a PhD degree in his/her field and with many years of teaching and research experience. The majorities of the faculty have worked in other universities and

some have supervised many Master's theses and PhD dissertations. No additional faculty is requested to support this proposal.

Project Enrollment

Initially, this proposal can help increase the number of graduate students enrolled in each Master's degree program by at least 5. However, the availability of such ABM path may help attract more students to the engineering departments, thus increase the number of undergraduate student eligible to enroll in this program. It is anticipated that the ABM will help increase the number of students enrolled in the Master of Science in Electrical Engineering (MSEE) program by at least 10 students within five years.

Adequacy of Current Facilities, Supplies, and Equipment

The proposed program will not require additional space for its facilities. Research laboratories in the two graduate program areas of emphasis have already been established. However, more office, teaching, and research supplies may be need.

Estimated Costs, Available Funds, and Probable Funding Sources

This proposal does not establish new program or increase the cost of existing graduate program. Therefore, there is no cost associated with this proposal. Moreover, this proposal will improve the efficiency of utilizing resources available to existing graduate programs, and help strengthen existing graduate program by increasing their enrollment. This proposal will also help improve the quality of research conducted by the students and the faculty of SEAS engineering departments and may also help improve the level of external funding.

Adequacy of Supportive library and Technical Staff

The UDC has an adequate supportive library and technical staff. Subscription to the Institute of Electrical and Electrical Engineering (IEEE) digital library (IEEE Xplore) and the Association of Computing machinery (ACM) digital library provide access to the state-of-the art research activities and development in the electrical engineering filed. Subscriptions to other engineering fields are also available at UDC library and at the libraries at the consortium of universities affiliated with UDC. We have worked collaboratively with the LRD on these acquisitions.

Appendix A: A Selective List of Institution with program similar to the proposed ABM program

No.	Academic Institution	Academic Institution Web Site Link	Double Counted Credits (Max)
1	The University of Maryland (College Park)	http://www.ece.umd.edu/Academic/Grad/BS_MS/index.php	9
2	George Mason	http://catalog.gmu.edu/preview_program.php?catoid=15&poid=5736&returnto=1031	6
3	Georgia Tech.	http://www.ece.gatech.edu/internal/students/bsms_prog/index.html	6
4	The University of Tennessee (Knoxville)	http://catalog.utk.edu/preview_program.php?catoid=5&poid=1586	6
5	North Carolina State University	https://www.ece.ncsu.edu/undergraduate/abm	12
6	University of Maryland, Baltimore County	http://www.cs.umbc.edu/portal/ComputerEngineering/cmpe_ugrad/main/links.shtml	9
7	Old Dominion University	http://eng.odu.edu/ece/academics/grad/programs/bs_ms_prog.shtml	6
8	Purdue University, Indianapolis	http://www.engr.iupui.edu/ece/bs_special.shtml?menu=bs	select upper level electives
9	The Ohio State Univ.	http://ece.osu.edu/futurestudents/graduate/bsms	9
10	University of Massachusetts, Dartmouth	http://www1.umassd.edu/engineering/ece/graduate/bsms.cfm	9
11	Columbia University	http://www.ee.columbia.edu/pages/academics/IntergratedBS_MSProgram/index.html	6

12	Drexel University	http://www.ece.drexel.edu/dual_degree.html	Zero. However, reduces the requirement for BS from 192 to 180 credits.
13	Case Western Reserve	http://engineering.case.edu/current-students/academic-programs/bs-ms	9
14	Worcester Polytechnic Institute.	http://www.wpi.edu/academics/ece/bsms-programs.html	12
15	Washington University, Saint Louis	http://ese.wustl.edu/undergraduateprograms/Pages/bs-ms.aspx	6
16	Villanova University	http://www1.villanova.edu/villanova/engineering/departments/electrical/undergrad/5year.html	9
17	Florida International University	http://www.cec.fiu.edu/academics/accelerated-bsms/bsms-computer-engineering/	6
18	Iowa State University	http://www.ece.iastate.edu/academics/concurrent-degree-programs/	6
19	University of Colorado at Boulder	http://ecee.colorado.edu/academics/grad/BS_MS.html	6
20	Colorado School of Mines	http://gradschool.mines.edu/Combined	6
21	University of Florida	http://www.cise.ufl.edu/academics/undergrad/bsms/	12
22	Florida Atlantic University	http://www.ceecs.fau.edu/computer-engineering/5-year-joint-bsms-degree-program	9
23	Texas Tech University	http://www.depts.ttu.edu/ece/testing/grad/bsms/	9
24	George Washingt	http://www.seas.gwu.edu/ece/prospective/undergraduate/documents/5-Year%20BS%20MS%20Program.pdf	6

	on University		
25	Binghamton University, NY	http://www.binghamton.edu/ece/grad/accelerated-degree-programs.html	6
26	New Mexico State University	http://www.ece.nmsu.edu/BS_MS_Program.htm	6