# University of Maryland Eastern Shore
# Enterprise System Program Overview

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**Date:**     07/21/15

## Welcome Message from the Department's Chair

Welcome to the Department of Mathematics and Computer Science at the University of Maryland Eastern Shore! With our commitment to excellence we exemplify Hawk Pride. We foster a student centered and highly supportive learning environment where our students benefit from a uniquely intimate setting supported by a student to faculty ratio of 14 to 1.

As a Department, we emphasize broad academic preparation to enhance and nurture the intellectual, professional, academic, interpersonal and social development of students.

We are a Department dedicated to becoming a regional leader in providing the opportunity for diverse, motivated students to receive a high quality education while majoring in mathematics and enterprise system management.

Graduates with degrees in business can look forward to a wide range of career opportunities in business, government, academic, and not-for-profit organizations. Many students benefit from internships, which may result in academic credit as well as experiences. While many students elect to enter the professional world immediately after graduation, our graduates are fully prepared to pursue graduate studies.

I look forward to welcoming you personally!

Best Regards,

*Robert*

**Robert A. Johnson, Jr, Ph.D**
Chair & Associate Professor

## Who we are

The University of Maryland Eastern Shore (UMES) is an 1890 Land-Grant Institution authorized by the State of Maryland through the Maryland Higher Education Commission (MHEC) to offer bachelor's degrees in 32 areas, master's degrees in 10 areas, and doctorate degrees in seven areas. As an 1890 Land-Grant Institution, UMES is a teaching, research, and doctoral granting institution that nurtures and launches leaders in a student-centered environment. Committed to providing high quality programs in an ethnically diverse environment, the University prepares students, particularly from among ethnic minorities, who will serve and shape the global economy. UMES is a growing, primarily residential university with learning, discovery, and engagement missions consistent with valuing the scholarship of faculty in discovering, disseminating, and applying knowledge to the extended community.

UMES, one of the higher education colleges and universities in Maryland, is accredited by the Middle States Commission on Higher Education (MSCHE). The University was reaffirmed by the Middle States Commission on Higher Education in 2006. In addition to the institutional accreditation, major programs in the University have been mandated for national accreditation in line with the President's doctrine on academic quality as articulated in the 2006 UMES document on "Learning and Leadership," which states that the vision of former UMES President, Dr. Thelma B. Thompson, "rests on a commitment to sound academic quality…".

The School of Business and Technology is one of four academic units at UMES connected to the overall structure of the University. SBT is comprised of five departments: Business, Management and Accounting Engineering and Aviation Sciences; Hotel and Restaurant Management; Mathematics and Computer Science; and Technology. UMES' enrollment as of Fall 2008 was 4,290 students, of which the SBT enrollment was 1,104.

## How We Go About Our Business

The mission of the Department of Mathematics and Computer Science at the University of Maryland Eastern Shore is to deliver high quality education to students majoring in mathematics and enterprise systems management, as well as to provide core STEM courses to other majors throughout the university. Our mission is supported by the intellectual contributions of faculty, in that these scholarly activities contribute to instructional effectiveness. The focus is on breadth in curricula that facilitates employment and professional career development in the private, public, and not-for-profit sectors of a global economy.

In addition, the Department's curricula are designed to enhance students' awareness of the moral and ethical issues confronting organizations. The role of technology in the decision-making process is emphasized by the integration of computer concepts and applications throughout the curricula. The Department's diverse, multicultural student body is assisted in the development of high-level intellectual, interpersonal, technical, and communication skills. The Department is committed to becoming a regional leader in providing the opportunity for diverse, motivated students to receive a high quality management education. This vision is guided by the need for continuous improvement in program quality in learners to meet the challenges of an ever-changing global society.

IBM and UMES began a joint partnership in 2008. The goal of the partnership was, and continues to be, to provide academic and professional opportunities to primarily first generation and minority students while preparing the next generation of enterprise computing professionals to alleviate industry shortfalls. The first course offered as part of the initiative CSDP288-Introduction to Enterprise Systems was introduced in 2009. The course covered a lot of diverse material which created a larger than expected labor requirement. Much more active project management was needed versus estimated. Students across disciplines en-rolled in the course, which was taught via a cross team effort with a large "can do culture" in the face of difficult product deliverables.

A number of students were placed into internships following completion of the course. Overtime, the course offering and the number of students participating has increased. As of the spring 2012, over 120 students have enrolled in the enterprise systems courses, eleven (11) students have been placed in internships, and twelve (12) students have been offered permanent employment. These numbers make the fairly young IBM partnership UMES's most successful initiative to date. UMES has emerged as the focus point for the IBM Academic Initiative. The current project seeks to expand the current effort in order for the project to meet its potential for both IBM and the University so as to serve as a national exemplar for similar partnerships.

## Program Description

**UMES**
*Enterprise Systems
Management*
**Program**
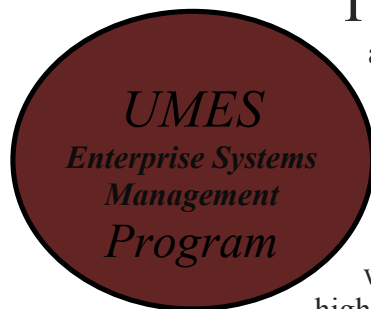
The programs offered in the Department of Mathematics and Computer Science are grounded in the liberal arts. More than 50 percent of the curricula comprise general education and other liberal arts courses necessary for the development of each student's cognitive skills. These programs prepare students for professional careers in accounting and managerial positions.

The purpose of this program is to enhance the value of UMES School of Business and Technology's curriculum offerings to prepare students to meet the new global challenge of providing American industry with skilled workers capable of responding to the rapid emergence of advanced technologies in the new high-performance workplace.

This will be accomplished by infusing enterprise/mainframe technology in selected course offerings and introducing a legacy system focused Enterprise System major in the Department of Mathematics and Computer Science.

> According to the US Department of Labor ---"In the US alone, 1.5 million additional skilled professionals are expected to be needed by 2006".

The central focus of this program is the development of strategic partnerships with IBM and its business partners to provide internship, full-time employment, and faculty research opportunities for our students and faculty in the School of Business and Technology. The lead department for this initiative is Mathematics and Computer Science. Ultimately, the key to the success of this program is a unique partnership with have forged with IBM Academic Alliance. Thus far, we have been successfully in forging strategic partnerships with IBM and Deposit Trust Clearing Corporation (DTCC), a major firm on Wall Street. In 2010, we were successful in getting six of our students pass the first stage of the interviewing process with DTCC, of which two were offered full-time employment at an estimated total compensation of $77,000.

We were able to successfully help these candidates to obtain interviews even though none of them currently possess all of the prerequisites skills identified by DTCC, which are embedded in our zOS, COBOL and Assembler courses. More importantly, this initiative provides UMES an opportunity to secure a niche in the marketplace. Our conversations with IBM and many of its partners, such as DTCC, suggest that they are totally dissatisfied with the response that they have received from most universities in offering courses focused on enterprise computing and more importantly legacy systems. But, the window of opportunity can close as quickly as it has opened. As cursory review of DTCC board indicates there is a tremendous upside potential to our relationship with DTCC (www.DTCC.com).

The members of DTCC board include all of the major investment and commercial banks in the United States. It goes without saying that these are precisely that type of business partners UMES needs to go to the next level. Our sense is that it is critical for UMES to take a very clear eyed approach if we expect to seize this unique opportunity. Our success to date represents only the "tip of the iceberg". By making this upfront investment we can reap an even greater benefit in the next couple of years.

We have already received access to a $2 million z10 mainframe computer through the IBM Dallas Innovation Center and we haven't begun to scratch the surface of its potential research and teaching benefits to the faculty and our students. For example, we worked with IBM to secure a paid research opportunity for a student and one of our computer science faculty in its Poughkeepsie manufacturing facility's testing operations. Finally, we are working with our strategic partners to assess the feasibility of developing an undergraduate internship program exclusively for UMES students. This program will enable us to develop a "pipeline" of students into their company and offer value real world experience for students interested in both distributed and enterprise computing careers.

## The Way Forward – Our Vision of the Future

Our integrated paradigm offers the following main features that support the training and development of new and existing enterprise systems management professionals.

- **Curriculum Development**. the propose project will expand the current two course offering by adding the introduction of a sequence of four additional courses to be offered in both in-person on campus format as well as deliverable online to students off campus. Courses under development will include Enterprise Computing II, Testing II, Testing III, and Testing IV. Highlights of the proposed curriculum will include hands-on simulation based instruction; inter-action between instructors, students, and industry professionals; computerized record-keeping and progress reporting; use of electronic portfolios; development of online assessments; development of a student community supported via social networking technology; student internships; and integration of authentic and alternative assessments evaluated using validated rubrics and other instrumentation.

  Further, the curriculum will integrate the basic beliefs and management principles of the IBM corporation including: respect for the individual; excellence in customer service; superior accomplishment of all tasks; effective management that motivates others, fosters communications, includes vision, asks questions, and is open to new ideas; obligation to stakeholders; strong corporate citizenship; ethical conduct; group work without groupthink; quality assurance; and critical thinking.

- **Career Support and Development**. The project will assist in the development of new enterprise computing professionals by providing in-person, online, and teleconferencing career consulting services to college students. Drop in hours will be made available to students enrolled on the UMES campus and technology will enable career guidance to be provided to offsite college students. The career support and development services to be offered will include career counseling regarding opportunities in enterprise computing and system testing, resume preparation (standardized to meet project standards), pre-screening and interviewing of students, internship and job placement assistance, and an outstanding internship program.

- **Internship Pipeline**. The internship program to be developed will mark an expansion of current internship efforts to a more systemized approach. The new approach will include: the development of an internship handbook, a checklist of activities to be completed by students, maintenance of a weekly log during placement by students to be checked off by employer(s), an intern evaluation instrument (rubric) to be completed by employer and university supervisor, weekly check ins by a university supervisor, development of a student project to be completed during the internship, as well as procedures and protocols for different events that may arise. Students who have completed the program will be prepared to join the 100 year old IBM legacy exemplifying the IBM idiom Win, Execute, and Team.

- **Development of New Partnerships.** Through our strategic consultant new partnerships with IBM clients will be developed. These partnerships will result in greater notoriety for the University, internship and employment opportunities for students, as well as help meet employment demands and solve shortages in the availability of skilled enterprise computing professionals.

- **K-12/Community College Outreach.** Institute staffers will visit and make presentations at high schools and community colleges in order to inform students about opportunities in enterprise computing and system testing. Presentations will also be made to high school and community college teachers employed in Maryland, Virginia, and Delaware. A newsletter will also be produced and distributed. Finally, the institute will participate in and/or support an existing annual workshop held in October for career and technology educators in conjunction with the MSDE Program Affiliate for Business.

- **Institute for Enterprise Systems Management Learning and Laboratory Space**. The Institute will establish a physical presence that includes staff offices for productivity and student faculty consultations; a lobby area with computers available for student registration, job/internship searching/application, resume and cover letter preparation; meeting area; and a learning and laboratory space. The learning and laboratory space will be dedicated to enterprise computing and systems testing. It will be used for the offering of courses, hosting of workshops, student collaborative projects, research, guest speakers, and for tutoring. The learning and laboratory space will be capable of accommodating courses of up to 34 students and when not in use for classroom based instruction will serve as a learning, tutoring, and research lab.

- **Guest Lecture/Speaker Series**. The proposed institute will support a guest speaker annual series, professional development workshop, and once a semester informational sessions for students that feature IBM and other enterprise computing professionals.

- **E-portfolio Project**. An e-portfolio his project will use the Blackboard portfolio system to support the integration of a student generated electronic portfolios for assessment, self-reflection, professional growth and development, evaluation by potential employers, and critical thinking. The e-portfolios will be created by all students completing the program and will represent progress towards mastery of the learning and professional objectives of the program supported by artifacts and reflections. Electronic portfolios will be presented to a team of university and industry professionals and assessed using a validated rubric.

- **Collaborative Research**. The Institute will support and grow collaborative research projects. Faculty members at UMES and other institution, students, as well as professionals at IBM and its respective clients; will be encouraged to engage in collaborative research projects, papers, and presentations. These efforts will be supported through the introduction of a proposed internationally peer reviewed Journal of Enterprise Computing and System Testing to be published through a partnership with an existing American publisher of top tier A and B level Cabell's ranked IT and IT education journals.

Additionally, institute representatives will travel to make research presentations at the annual IBM sponsored conference as well as top tier academic conferences. Finally, in year three, the institute will host an existing international scholarly conference for which institute personal al-ready serve as a director. The conference will make enterprise computing the theme and include a strand dedicated to research conducted on system testing. Finally, the possibility of the development and publication of a textbook will be explored.

- **Providing Role Models to Minority Students.** Enterprise computing professionals will be invited to serve as role models, help in retention and accountability efforts, and serve as members of our advisory board. Remote mentoring of students or information exchange with instructors with key test technical leaders or upcoming test technical leaders will be supported.

- **Measurement of Project Activities**. Extensive data will be collected for measuring the impact of the project activities. The data collected will include: student enrollment; student performance in program courses via exam scores and project rubrics; longitudinal assessment of student development via rubrics used to evaluate student e-portfolios; data collected from student and employers involved in internships; as well as through the collection of survey data. Longitudinal da-ta will be collected from employers and employed program graduates via surveys.

- **Cross Discipline Concentrations**. The following information is being presented to propose that six Bachelor of Science degree concentrations be added to the curriculum of the School of Business & Technology in **Enterprise Systems Management** at the UMES. The propose courses of study would provide students with a solid liberal arts grounding while fostering the students' ability to integrate critical, theoretical, ethical, and global perspectives in the **Enterprise Systems**.

Many large companies continue to rely on mainframes, yet the professionals who manage and operate these systems are retiring. The proposed **Enterprise Systems Management** concentrations are designed to address this critical skills shortage by offering one interdisciplinary educational programs in each of the academic departments which comprise the School of Business & Technology.

Since 2008, UMES and IBM have jointly developed a program designed to educate undergraduate students who are entering the field as well as those with experience in System z™ and z/OS, AIX on Power Systems, and a variety of application programming tracks including COBOL, DB2, Assembler language and IMS. A combination of lecture and "hands on" experience helps build valuable skills needed by mainframe professionals. By integrating both theoretical perspectives and practical applications, the **Enterprise Systems Management** concentrations will provide opportunities and preparation for multi-ethnic, diverse students to begin careers in **Enterprise Systems Management**.  In addition, students are prepared for advanced study in management and other areas of their choice.

# Client Satisfaction- Where the Rubber Meets the Road (Our Partner's Perspective)

**How We Got in the Game:**

When Mr. Bill Lawrence, Senior Diversity Recruiting Program Manager from IBM, visited the campus at the behest of Dr. Ronald Brown, former Vice President of Student Affairs, in 2006 he made the following observation about our Computer Science program and its students.

> "Generally speaking, I like your students' basic interpersonal skills, but they currently don't have the requisite technical skills to meet the business needs of IBM or its business partners" "If you are willing to strengthened your curriculum to include more mainframe skills development we (IBM) would be more than willing to work with you to find employment opportunities for your students"

**How IBM Feels About Today:**

## Top System z Academic Initiative Reference Schools

### North America

- Syracuse University, NY *
- Illinois State University
- Marist College, NY
- University of Arkansas *
- Columbus State University, GA
- University of MD East Shore
- RIT NY
- Binghamton University
- Stevens Institute, NJ
- Northern Illinois University
- North Carolina A&T University
- Eastern Illinois University
- University of South Florida
- Washington University, MO
- Widener University, PA
- West Texas A&M *
- University of South Carolina
- San Jose State University, CA
- State Fair CC, MO
- Houston CC, TX
- Ryerson University, Canada
- Georgian College, Canada
- Cegep de Thetford, Canada

David Dischiave - ddischia@syr.edu
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Russ Schupp - rschupp@sfccmo.edu
Getachew Haile - getachew.haile@hccs.edu
Jashua Panar - jpanar@scs.ryerson.ca
Greg Rodrigo - grodrigo@georgianc.on.ca
Francois La Haye - flahaye@cegepth.qc.ca

Please contact these educators and ask about their mainframe curriculum and students.

For a list of more schools, see:
**ibm.com/**
**university/systemz**

## Dr. Bryant C. Mitchell Receives 2010 and 2011 IBM Faculty Award



The University of Maryland Eastern Shore is pleased to announce that Dr. Bryant C. Mitchell has been awarded a $30,000 IBM Faculty Award. The IBM Faculty Award Program is a competitive worldwide program intended: to foster collaboration between researchers at leading universities worldwide and those in IBM research, development and services organizations; and to promote courseware and curriculum innovation to stimulate growth in disciplines and geographies that are strategic to IBM.

Faculty Awards are cash awards granted annually. The current maximum award to any one recipient is $40,000 per year. IBM Faculty Awards are not contracts and no intellectual property rights are stipulated as part of a Faculty Award. We strongly encourage all work to be placed in the public domain. To qualify for this internationally competitive award, the nominee must be a full-time professor at an accredited university which has a Ph.D. or MBA program in the nominee's field. Candidates must have an outstanding reputation for contributions in their field or, in the case of junior faculty, show unusual promise.

IBM does not accept unsolicited requests or proposals for Faculty Awards. Candidates must be nominated by an IBM employee with common interests who will serve as a liaison for the collaboration. Awardees may be nominated for an award renewal, and renewal nominations engage in the same competition as first-time nominations. Dr. Mitchell received the $20,000 Award again in 2011 for his work with UMES/IBM Enterprise Computing Education Initiative. His work was instrumental in getting 16 UMES students internship and full-time employment opportunities with IBM and its business partners.

**http://www.umes.edu/sbt/index.html**

# Value Delivery System: Our Core Curriculum

Based on an industry survey conducted by Mr. John Thompson, a former UMES IT Industry Liaison, the following twenty-nine (29) credits represent the minimum courses requirements for a UMES non-computer student wishing to pursue a career in enterprise computing systems. It is possible to complete the requirements in two semesters. The course highlighted in yellow represent fall semester courses and the green represent courses that are recommended to take in during the spring semester.

| Course | Course Description | Credit s | Semester Offered |
|---|---|---|---|
| CSDP188 | **Introduction to Testing**. This course introduces students to hardware and software testing in enterprise computing environment. As a platform, we use IBM's Series z operating system as the operating system model, and the IBM Series z mainframe as the architectural model. The course is intended to facilitate the student's understanding of how hardware and software enterprise systems fit in the current business-computing paradigm. Theory and application of hardware and software enterprise systems will be covered, as will the primary tools of a mainframe environment. Prerequisite: Sophomore standing or consent of the instructor. | 3.0 | On-Line<br><br>Fall and Spring |
| CSDP221 | **Introduction to Computer Programming**. The course, primarily for departmental majors, is designed to introduce the student to computers and to programming in a high level language. Course topics include but are not limited to computer hardware, software, algorithms, programming methodology, and social and ethical implications of computing. The programming language C++ is used to learn input/output, arithmetic computation, control structures, subroutines and functions, string manipulation, arrays, and pointers. Significant emphasis is placed on coding and debugging of programs in the computer laboratory. Prerequisites: MATH 109 or MATH 110. This course is a prerequisite for all Computer Science majors. | 4.0 | Fall and Spring |
| CSDP222 | **Advanced Programming.** This course covers advanced programming language features, including structured programming, top-down, and object-oriented techniques. Emphasis is placed on team projects and structured walk-throughs. Much of the work in this course involves the construction and debugging of programs that accomplish realistic applications. Prerequisite: CSDP220. | 4.0 | Fall and Spring |
| CSDP240 | **Principles of Data Processing**. This course is an introduction to the COBOL language and its business data processing environment. Topics include the six divisions: arithmetic, | | |

| | | | |
|---|---|---|---|
| | input/output, control statements, control-break logic, tables, and searching logic. The course is a computer lab-based course involving extensive coding and debugging of small to large programs. Prerequisite: CSDP 221. | 3.0 | Fall and Spring |
| CSDP288 | **Introduction to Enterprise Computing.** This course introduces students to enterprise computing. As a platform we use IBM's Series z operating system as the operating system model, and the IBM Series z mainframe as the architectural model. This course is intended to facilitate the student's understanding of how large systems fit in the current business computing paradigm. Theory and application of large systems will be covered, as will the primary tools of a mainframe environment (Job Control Language, Job Entry Subsystem, Interactive System Performance Facility, System Display and Search Facility, Time Sharing Option, etc.). Other topics include mainframe data management, and operating system virtualization in a mainframe context will be covered. Prerequisite: BUAD 213 and consent of Instructor. | 3.0 | Online<br><br>Fall and Spring |
| CSDP301 | **Computer Organization and Assembly Language Programming**. This course the basic computer organization with emphasis on the lower-level abstraction of a computer system, including digital logic, instruction set and assembly language programming. Topics include data representation; logic gates; simplification of logical expressions; design and analysis of simple combinational circuit, such as decoders and multiplexers, flip-flops and registers; design and analysis of simple synchronous sequential circuit, random-access and read-only memories; instruction set architecture; and programming in assembly language. Prerequisite: CSDP 222. | 3.0 | Fall Only |
| CSDP398A | **Computer Language Topics A.** A reading/research course recommended for all computer science majors. The course allows the student to gain experience in new or otherwise unavailable programming languages (e.g., JAVA, C, LISP, ADA, PROLOG). At least one section in JAVA to satisfy major requirements will be given each year. This course may be repeated with different topics for a maximum of 12 credits. Prerequisite: CSDP 222. | 3.0 | Fall Only |
| CSDP401 | **Operating Systems.** This course is an introduction to the fundamentals of operating systems. Topics may include interrupts and recovery, inter-process communication and synchronization, process scheduling, deadlock, memory management, virtual memory file systems, scheduling, and distributed systems. Formal principles are illustrated with the examples and case studies of one or more contemporary operating systems. Prerequisites: CSDP 250 or CSDP 301. | 3.0 | Fall and Spring |
| CSDP404 | **Database Management Systems**. This course covers database management and the different data models currently used to structure the logical view of databases. It provides an introduction to concepts and design principles used in database management systems, including entity-relationship data model, physical and logical database design, relational databases, query language, transaction management, reliability, and security, and considers the social and ethical implications of computing. This course has a significant writing | 3.0 | Fall and Spring |

| | component. Prerequisite: CSDP 250. | | |
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**For More information about UMES**

**Visit: http://www.umes.edu/PR/Article.aspx?id=37970**