Document N: Course and Program Development:

IMPACT AND APPROVAL SIGNATURES

See Course and Program Development Policy and Procedures (www.ubalt.edu/provost) for instructions.

SCHOOL: ○ LAW ○ MSB ○ CAS ○ CPA

CONTACT NAME: Debra L. Stanley PHONE: 410 832 6082

DEPARTMENT/DIVISION: School of Criminal Justice DATE PREPARED: 11/14/12

PROPOSED SEMESTER OF IMPLEMENTATION: ○ fall ○ spring YEAR: 2013

TYPE OF ACTION: ○ add (new) ○ deactivate ○ modify ○ other
LEVEL OF ACTION: ○ noncredit ○ undergraduate ○ graduate ○ other

ACTION BEING REQUESTED (select one category, either Course Actions or Program Actions):

○ COURSE ACTIONS

Original Subject Code/Course Number:

Original Course Title:

PROGRAM ACTIONS

Original Program Title:

Master of Science in Forensic Science - High Technology Crime

Select one or multiple actions from one of the lists below (review the list of necessary documents and signatures):

COURSE ACTIONS

1. Experimental Course
2. Course Title
3. Course Credits
4. Course Number
5. Course Level
6. Pre- and Co-Requisite
7. Course Description
8. New Course
9. Deactivate Course
22. Other

PROGRAM ACTIONS

10. Program Requirements
11a. Undergraduate Specialization (24 credits or fewer)
11b. Master's Specialization (12 credits or fewer)
11c. Doctoral Specialization (18 credits or fewer)
12. Minor (add or delete)
13. Closed Spec Program
14. Program Suspension
15. Program Reactivation
16a. Certificate Program (UG/G) exclusively within existing degree program
16b. Certificate Program (UG/G) outside of or across degree programs (12 or more credits)
17. Off-Campus Delivery of Existing Programs
18a. Undergraduate Concentration (exceeds 24 credits)
18b. Master's Concentration (exceeds 12 credits)
18c. Doctoral Concentration (exceeds 18 credits)
19. Program Title Change
20. Program Termination
21. New Degree Program
22. Other

ADDITIONAL DOCUMENTATION (check all appropriate boxes of documents included; review the list of necessary documents):

☑ summary proposal (O) ☑ course definition document (P) ☑ full five-page MHEC proposal (Q)

☑ financial tables (MHEC) (R) ☑ other documents as may be required by MHEC/USM (S) ☑ other (T)
IMPACT REVIEW (review the list of necessary signatures):

<table>
<thead>
<tr>
<th>Impacted Entity</th>
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<tbody>
<tr>
<td>a. Library</td>
<td>Gray N.</td>
<td>11/20/12</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>impact statement attached</td>
<td></td>
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<tr>
<td>b. OTS</td>
<td>Paul P.</td>
<td>01/20/12</td>
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<td>c. University Relations</td>
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<td>d. Admissions</td>
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<td>e. Records</td>
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APPROVAL SEQUENCE (review the list of necessary signatures):

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<tr>
<td>A. Department/Division (Chair)</td>
<td>Debra L. Stanley</td>
<td>11/19/12</td>
</tr>
<tr>
<td>B. General Education (for No. 7, 8)</td>
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<tr>
<td>C. Final Faculty Review Body Within Each School (Chair)</td>
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<td>D. Dean</td>
<td>Laura A. Wilson-Jentz</td>
<td>11/27/12</td>
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<td>E. University Faculty Senate (Chair)</td>
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<tr>
<td>F. University Council (Chair)¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Provost and Senior Vice President for Academic Affairs</td>
<td>Beverly Schneller</td>
<td>2/29/2012</td>
</tr>
<tr>
<td>H. President</td>
<td></td>
<td>3/13/13</td>
</tr>
<tr>
<td>I. Board of Regents (notification only)</td>
<td></td>
<td></td>
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<tr>
<td>J. Board of Regents (approval)</td>
<td></td>
<td>2/11/13</td>
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<td>K. MHEC (notification only)</td>
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<td>L. MHEC (approval)</td>
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<td>M. Middle States Association notification</td>
<td>Required only if the University's mission is changed by the action</td>
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¹University Council review (for recommendation to the president or back to the provost) shall be limited to curricular or academic policy issues that may potentially affect the University’s mission and strategic planning, or have a significant impact on the generation or allocation of its financial resources.
Document O: Course and Program Development: SUMMARY PROPOSAL
See Course and Program Development Policy and Procedures (www.ubalt.edu/provost) for instructions.

SCHOOL: 〇 LAW 〇 MSB 〇 CAS 〇 CPA

CONTACT NAME: Debra L. Stanley PHONE: 410 832 6082

DEPARTMENT/DIVISION: School of Criminal Justice DATE PREPARED: 11/14/12

PROPOSED SEMESTER OF IMPLEMENTATION: 〇 fall 〇 spring YEAR: 2013

ACTION BEING REQUESTED (select one category, either Course Actions or Program Actions):

〇 COURSE ACTIONS
〇 PROGRAM ACTIONS

Original Subject Code/Course Number:

Original Course Title:

Original Program Title:

Master of Science in Forensic Science - High Technology Crime

Select one or multiple actions from one of the lists below (review the list of necessary documents and signatures):

COURSE ACTIONS
1. Experimental Course
2. Course Title
3. Course Credits
4. Course Number
5. Course Level
6. Pre- and Co-Requisite
7. Course Description
8. New Course
9. Deactivate Course
10. Other

PROGRAM ACTIONS
10. Program Requirements
11a. Undergraduate Specialization (24 credits or fewer)
11b. Master’s Specialization (12 credits or fewer)
11c. Doctoral Specialization (18 credits or fewer)
12. Minor (add or delete)
13. Closed Site Program
14. Program Suspension
15. Program Reactivation
16a. Certificate Program (UG/G) exclusively within existing degree program
16b. Certificate Program (UG/G) outside of or across degree programs (12 or more credits)
17. Off-Campus Delivery of Existing Programs
18a. Undergraduate Concentration (exceeds 24 credits)
18b. Master’s Concentration (exceeds 12 credits)
18c. Doctoral Concentration (exceeds 16 credits)
19. Program Title Change
20. Program Termination

For changes to existing courses:

OLD TITLE

NEW TITLE

SUBJECT CODE/COURSE NO. CREDITS

SUBJECT CODE/COURSE NO. CREDITS

Summer 2010
We are requesting the approval of a new graduate degree program, a Master of Science in Forensic Science - High Technology Crime that will be housed in the School of Criminal Justice, College of Public Affairs.

The proposed inter-disciplinary M.S. degree program in Forensic Science – High Technology Crime will build on and support each of the institutional goals set forth by the University of Baltimore and the College of Public Affairs, while also contributing to the university's projected growth goals. The program will also create opportunities for the expansion of existing degree programs by attracting students, interested in forensic science, who might not otherwise pursue graduate study at the University of Baltimore. This will be accomplished by educating our MSFS students and meeting the need for experts in the rapidly changing field of high technology crimes; and by enabling our students to use the knowledge they've garnered for the successful investigation of crimes.

The MSFS is designed to provide students with a broad based practical understanding of high technology crimes. The core of the program exposes students to forensic investigation techniques and skills, computer and digital information crimes fraudulent activities in financial and health systems, financial and health care fraud, prevention and security management strategies, and legal interventions and resolutions.

The proposed program will consist of core courses in forensic investigative techniques, cyber investigations, incident management, data protection, legal aspects of management, infrastructure protection, the globalization of crime, network security, fraud investigations, and data mining techniques. Presently, we are envisioning three specializations in the Master of Science in Forensic Science - High Technology Crime (MS in FS) degree program that may include -computer forensic analysis, incident management and cyber investigations. Students at USG enrolled in either the Cyber-Security BS degree or the BS in CJ and Criminology will have a clear pathway to advanced management in their fields with the addition of UB's MS in Forensic Science-High Technology Crime. The proposed program, with its applied pedagogy, features interactive learning not replicable in a virtual environment. Students already enrolled in programs at USG in science, nursing, business, and computer science, as well those in the undergraduate criminology and criminal justice programs may be interested in the professional pathways this program offers. The degree consists of a total of 42 credits.

SET FORTH THE RATIONALE FOR THIS PROPOSAL:

The MSFS degree program will develop students' knowledge and skills as experts, in the recognition of high technology crimes, thereby preparing them to investigate the crimes of the 21st Century. The proposed MSFS degree program would be the only one like it offered at a public institution in the region, making it potentially more affordable for students.

The most recent employment data (2010) from the Bureau of Labor Statistics affirms the demand for employees in cyber security related work, both within governments and in the public sector. The average salary for the greater Baltimore-Washington, DC- Northern VA areas, where statistics are taken, is over $96,000. In Maryland, 68,000 people are employed in security related occupations and a recent search of Indeed.com, a jobs website, indicates 342 job openings at all levels in cyber security, with 307 at starting salaries of $50,000 or more. Since 2010, the local presses have been reporting the increase in demand for qualified security personnel, revealing that private sector businesses in particular, are unable to hire "enough qualified workers" given "the tight pool of high-tech specialists and workers with government security clearances" ("Wanted Cybersecurity Pros" 1 August 2010 The Baltimore Sun). In addition, in February 2012, Sen. Barbara Mikulski presided at the opening of the new National Center for Excellence in Cybersecurity in Gaithersburg, MD with the purpose of encouraging partnerships between higher education, government, and private sector companies to educate students for evolving jobs in cyber security fields. Given the employment rates and the demand for new hires in this area, no one college, university, educational center or training program will be able to produce enough potential employees statewide. As noted in the 2012 Southern Maryland Online article by Varun Saxena, "The creation of the National Cyber Center fulfills a goal identified in a 2010 strategic report on cybersecurity in Maryland" that emanated from the Governor's desk. Within this same spirit, UMUC developed their program in cyber security at the undergraduate and graduate levels. A review of their course offerings suggests the focus of their program is in keeping with the 2006 National Science and Technology Council report, The Federal Plan for Cyber Security and Information Assurance Research and Development. In contrast to programs focused on protecting information from unauthorized access, UB's program is centered around the "crime" that results from breaching information assurance protocols. UB's proposed program is interdisciplinary, and focuses specifically on forensic cyber analysis. As noted above, the program extends and complements our existing undergraduate degrees in Criminal Justice and in Forensic Science.

The program, developed in consultation with the FBI, statewide law enforcement, and the chief executive officers at Citigroup Security, is intended for members of private corporations, nonprofit organizations, and governmental agencies who desire to advance their competencies in managing advanced technological resources to combat cyber threats, and related...
Langsdale Library Impact Statement - Master of Science in Forensic Science — High Technology Crime

Although Langsdale Library has made considerable efforts in recent years to strengthen the collection in Forensic Studies, we have limited periodicals and online resources for this program outside the general criminal justice databases.

Additional conversations with faculty on specific content areas and research needs are warranted. I anticipate that we would need funding to seed a new monograph collection and as well as to maintain annual subscriptions for journals and databases.

Lucy Holman
Director, Langsdale Library
The new program outlined in the attached will have impact on the Offices of Admission as follows:

I. **Enrollment Targets**
   - As a result of competition from other degree programs and, in particular, the emergence of competition from profit-driven institutions, sources for a large number of “suspects” must be identified that might be interested in the program and related programs (suspect lists are things like standardized test records or professional organization rosters that can be purchased or otherwise acquired); the ratio of “suspects” to enrolled is ~ 500:1 and the yield from prospect to enrolled student has been determined to be 10:1; i.e. 500 “suspects” are needed to yield 50 identified prospective students that have potential to result in enrollment of 5 new students.
   - Future targets for annual enrollment numbers should result from agreement between EMSA Division and CPA and be approved by the Executive Committee at UB.

II. **Recruitment**
   - Minimize costs and impact on limited recruitment staff by bundling recruitment activities for this program with those serving other graduate programs in the College of Public Affairs.
   - Contact, cultivate, recruit and evaluate prospective students and applicants, in conjunction with program director and CPA staff.
   - Notify and cross-train admission, EMSA operations and recruitment staff to develop understanding of the new program.
   - Establish admission standards for the new program.

III. **Marketing and Collateral**
   - Develop promotional strategy and language that distinguishes the program from competitors.
   - Write, approve, and print new marketing materials.
   - Create messages for prospect communication flow.
   - Update all recruitment materials that include comprehensive program lists.
   - Develop and approve email campaigns for program.

IV. **Prospect Management**
   - Create web page for program; website changes will require approximately 30-40 hours of effort.
   - Add links on general graduate pages for program specific web pages.
   - Post announcement on UB landing page.
   - Update UB RFI to include new program.
   - Update ID5 forms to include new program.
   - Update PeopleSoft recruitment tables to include new program.
   - Create communication flow prospect checklist.
   - Create messages for prospect communication flow.

V. **Application Processing**
   - Update PeopleSoft admission tables to include new program.
   - Add application requirements checklist to PeopleSoft checklist tables.
   - Assign trigger for requirements checklist.
   - Assign security for requirements checklist.
   - Update electronic application.
   - Update paper and PDF copies of application.
   - Update ImageNow properties for routing rules in workflow.
   - Update iStrategy with new plan code.
   - Update decision letters.
Impact Statement From the Office of University Relations

Please be advised that any programmatic changes are likely to affect recruitment and other publications as well as Web content produced and/or managed by the Office of University Relations that contain this type of specific academic information. Please inform Catherine Leidemer (cleidemer@ubalt.edu or 410.837.6164) of any proposed changes that receive final approval and of any planned implementation timelines.

The timing of the final approval for these changes will be a determining factor in our ability to incorporate the new information in a timely fashion in any relevant materials that are on our production schedule. As a general guideline, the Office of University Relations should be notified of any programmatic changes to a scheduled recruitment publication at least two months prior to printing.
Office of Technology Services
Impact Statement
Course and Program Development

M.S. in Forensic Science – High Technology Crime

The College of Public Affairs’ new graduate degree program does have ramifications for the Office of Technology Services (OTS). The Office of Technology Services is likely to be impacted in the following ways:

1. Creation of “contained” computing environments to stage criminal activity:
   1. The addition of a new computer lab (programmatic), and possible sub-domain
   2. Possible use of UB virtualization solutions to provide specialty software to remote users.
2. Use of existing OTS lab and laptop cart resources
3. Expansion of UB presence in Shady Grove computer labs
4. Possible scheduling impact for staff or student employees
5. Possible impact in licensing agreements or work with vendors
6. Development of new online courses or synchronous delivery of courses, between UB and Shady Grove, specific to this degree program will require several months of preparations.

OTS would encourage CPA to coordinate efforts with Paul Walsh, Director of Instructional Technologies and e-Learning in order to provide resources and coordinate new labs.
February 21, 2013

Mr. Robert Bogomolny
President
University of Baltimore
1420 North Charles Street
Baltimore, MD 21201

Dear Bob:

This is to officially inform you that the Board of Regents, meeting in public session on Friday, February 15, 2013, at the University of Maryland, Baltimore County, approved the proposal from the University of Baltimore to offer the Master of Science in Forensic Science.

The Committee on Education Policy and Student Life, meeting on January 16, 2013, recommended Board approval.

Sincerely yours,

[Signature]

William E. Kirwan
Chancellor

cc: Joann Boughman
Teri Hollander
Janice Doyle
February 28, 2013

Joseph S. Wood, Ph.D.
Provost and Senior Vice President
University of Baltimore
1420 North Charles St.
Baltimore, MD 21201

Dear Dr. Wood:

The Maryland Higher Education Commission has reviewed a request from the University of Baltimore to offer a new Master of Science (M.S.) program in Forensic Science – High Technology Crime. I am pleased to inform you that the program has been approved. This decision was based on an analysis of the program in conjunction with the Maryland Higher Education Commission’s Policies and Procedures for Academic Program Proposals, the Maryland State Plan for Postsecondary Education, and a thirty-day review by the Maryland higher education community. The program demonstrates potential for success, an essential factor in making this decision.

For purposes of providing enrollment and degree data to the Commission, please use the following HEGIS and CIP codes:

<table>
<thead>
<tr>
<th>Program Title</th>
<th>Degree Level</th>
<th>HEGIS</th>
<th>CIP</th>
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<tr>
<td>Forensic Science – High Technology Crime</td>
<td>M.S.</td>
<td>2105-06</td>
<td>43.0116</td>
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</table>

Should the program require any substantial changes in the future, please keep the Commission apprised. I wish you continued success.

Sincerely,

Danette G. Howard, Ph.D.
Secretary of Higher Education

DGH:LJL:wrf

C:  Ms. Diane Hampton, Director of Institutional Relations, MICUA
    Ms. Theresa Hollander, Associate Vice Chancellor, USM
    Dr. Paul D. Lack, Executive Vice-President for Academic Affairs, Stevenson University
UNIVERSITY SYSTEM OF MARYLAND INSTITUTION PROPOSAL FOR

X New Instructional Program

Substantial Expansion/Major Modification

Cooperative Degree Program

Within Existing Resources, or

Requiring New Resources

University of Baltimore
Institution Submitting Proposal

M.S. Program in Forensic Science – High Technology Crime

Title of Proposed Program

M.S. Program in Forensic Science – High Technology Crime

Award to be Offered

FALL 2013

Projected Implementation Date

[210505]

Proposed HEGIS Code

Debra L. Stanley, Ph.D.
Charles Tumosa, Ph.D.

School of Criminal Justice
College of Public Affairs

Department in which program will be located

(410) 837-6082
(410) 837-5302

Contact Phone Number

dstanley@ubalt.edu
c tumosa@ubalt.edu

Contact E-Mail Address

12.13.12
Date
The University of Baltimore proposes to offer this program at both the University of Baltimore campus and the Universities at Shady Grove (USG), with the exception of the Forensic Accounting specialization which will not initially be offered at USG. Additional information regarding the off-campus request is on Page 12 of this proposal.

Mission

The mission of the University of Baltimore assures that the “university’s emphasis on career-oriented education attracts students with clear professional objectives and provides them with a broad foundation of knowledge to meet the rapidly changing conditions of today’s work environment as well as with the latest skills and techniques for productive careers in the public and private sectors.” Additionally, the University of Baltimore endeavors to “advance the intellectual, professional, and economic life of the metropolitan areas, the state of Maryland, the mid-Atlantic region, and beyond.” The mission of the University of Baltimore is comprised of four elements: (1) making excellence available to students motivated by professional advancement and civic awareness; (2) establishing a foundation for lifelong learning, personal development and social responsibility; (3) combining theory and practice to create meaningful, real-world solutions to 21st-century urban challenges; (4) and being an integral partner in the culture, commerce and future of Baltimore and the region. Within this broader context, the College of Public Affairs seeks to prepare problem-solvers who will analyze policy and lead public, nonprofit, health-care, and third sector organizations of the future.

The proposed inter-disciplinary M.S. degree program in Forensic Science – High Technology Crime (MSFS) will build on and support each of the institutional goals set forth by the University of Baltimore and the College of Public Affairs, while also contributing to the university’s projected growth goals. The interdisciplinary nature of the MSFS program may attract new students, interested in forensic science, health care fraud, and/or forensic accounting who might not otherwise pursue graduate study at the University of Baltimore. This will be accomplished by educating our MSFS students and meeting the need for experts in the rapidly changing field of high technology crimes; and by enabling our students to use the knowledge they have garnered for the successful investigation of crimes.

The MSFS will develop students’ knowledge and skills as experts in the recognition of high technology crimes, thereby preparing them to investigate the expanding area of criminal activity relating to technology. These high technology crimes include, but are not limited to, criminal activity involving the use of computer and digital information systems, accounting fraud, and health care fraud.

The University of Baltimore and the College of Public Affairs excel in the preparation and the delivery of education that has practical application (“Knowledge that works”). The goal has largely been to prepare students for opportunities at the local, regional and national levels. The School of Criminal Justice is uniquely situated to provide education to students who seek careers in forensic investigations, and the new degree program is a 21st century reflection of the university’s mission to impart knowledge that works and to provide students an opportunity to be agents of positive change.
Characteristics and Uniqueness of the Proposed Program

Adequacy of Curriculum Design and Delivery to Related Learning Outcomes

Program Description: The MSFS is designed to provide students with a broad based practical understanding of high technology crimes. The core of the program exposes students to forensic investigation techniques and skills, computer and digital information crimes, financial and health care fraud, prevention and security management strategies, and legal interventions and resolutions.

Educational Objectives: The graduate program in Forensic Science is designed to offer an opportunity for students who are interested in advanced forensic investigations of high technology crime relating to computer and digital information systems to develop advanced knowledge and skills that will allow them to compete for careers in government and private-sector corporations for highly evolving jobs in cyber security fields.

Admissions Standards: Acceptance into the MSFS is competitive. Applicants are expected to hold a bachelor’s degree in a relevant field of study, with a minimum cumulative grade point average of 3.0, from a regionally accredited college or university. Students wishing to transfer from other graduate programs are expected to have maintained at least a B average in their prior coursework. Students whose GPA fails to meet the standards outlined above may be admitted to the program on a conditional basis, at the Program Director’s discretion, provided that other aspects of the applicant’s application reflect the ability to do satisfactory graduate level work in the program. Applicants should submit transcripts from all universities attended, a personal statement, and at least one letter of recommendation, in addition to a completed application for graduate study.

Program Requirements: Total number of credits – 42 Credits (13 Courses)

The proposed program will consist of core courses in forensic investigative techniques, cyber investigations, incident management, data protection, legal aspects of management, infrastructure protection, the globalization of crime, network security, fraud investigations, and data mining techniques. Presently, we are envisioning four specializations in the MSFS–High Technology Crime degree program: 1) Cyber Intelligence; 2) Forensic Accounting; 3) Health Care Fraud; and 4) Cryptanalysis. Students at USG enrolled in either the Cyber-Security BS degree or the BS in Criminal Justice and Criminology will have a clear pathway to advanced studies in their fields with the addition of UB’s MSFS–High Technology Crime. The proposed program, with its applied pedagogy, features interactive learning not replicable in a virtual environment. Students already enrolled in programs at USG in science, nursing, business, and computer science, as well those in the undergraduate criminology and criminal justice programs may be interested in the professional pathways this program offers.

1 The Forensic Accounting specialization will require an additional 3-credit course if the prerequisite requirement has not been met.
CORE COURSES: 33 credits

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<td>2</td>
<td>FSCS 610 Identifying Organizational Liabilities and Crime</td>
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<td>3</td>
<td>FSCS 620 Forensic Investigative Techniques I</td>
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<td>4</td>
<td>FSCS 720 Forensic Investigative Techniques II</td>
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</tr>
<tr>
<td>5</td>
<td>FSCS 615 Information Retrieval</td>
<td>4</td>
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<tr>
<td>6</td>
<td>FSCS 724 Protection of Data/Information</td>
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<td>7</td>
<td>FSCS 730 Incident Response I</td>
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<td>8</td>
<td>FSCS 734 Incident Response II</td>
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<td>FSCS 740 Internship</td>
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<td>10</td>
<td>FSCS 750 Capstone (Project)</td>
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Thesis/ Non-Thesis Option: The final integrative component of the degree program is a core required Capstone Course. No thesis is required.

FOUR SPECIALIZATIONS: 9 credits each

Cyber Intelligence

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<td>2</td>
<td>FSCS 727 Computer &amp; Digital Forensics</td>
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<tr>
<td>3</td>
<td>FSCS 753 Computer &amp; Digital Security Management</td>
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Forensic Accounting *(ACCT504 is a required prerequisite)*

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<th>Status</th>
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<td>1</td>
<td>ACCT 601 Forensic Accounting Principles</td>
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</tr>
<tr>
<td>2</td>
<td>ACCT 603 Investigative Accounting and Fraud Examination</td>
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<tr>
<td>3</td>
<td>ACCT 604 Litigation Support</td>
<td>3</td>
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Health Care Fraud

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<tbody>
<tr>
<td>1</td>
<td>HSMG 698 Health Care Fraud and Detection Analysis</td>
<td>3</td>
<td>New</td>
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<tr>
<td>2</td>
<td>HSMG 691 Health Planning and Evaluation</td>
<td>3</td>
<td>Existing</td>
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<tr>
<td>3</td>
<td>HSMG 702 Special Analysis and Health Care Fraud</td>
<td>3</td>
<td>New</td>
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Cryptanalysis

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<tr>
<th>#</th>
<th>Course Title</th>
<th>Hrs.</th>
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<tbody>
<tr>
<td>1</td>
<td>FSCS 630 Introduction to Cryptanalysis</td>
<td>3</td>
<td>New</td>
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<tr>
<td>2</td>
<td>FSCS 635 Image Analysis</td>
<td>3</td>
<td>New</td>
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<tr>
<td>3</td>
<td>FSCS 640 Steganography</td>
<td>3</td>
<td>New</td>
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Total Hours 42
Adequacy of Provisions for Evaluation of Program

Student Learning Outcomes: With the completion of the MSFS program, the student within their own specialization should be able to:

- Identify and articulate the many modes of attack through digital space on computer systems and how these relate to criminal acts
- Recognize the many modes of attack through digital space on computer systems and evaluate their relationship to criminal acts
- Develop specialized knowledge within their disciplines to remediate such attacks
- Evaluate commercial or governmental programs with regard to criminal attacks
- Design solutions for commercial or governmental programs with regard to criminal attacks
- Initiate and develop effective counter-crime management programs

Course Evaluations and Assessment Plan: Procedures for conducting program and individual course evaluations will be outlined in a program assessment plan to be developed for the MSFS prior to the implementation of the program. The plan will identify overall program learning objectives and measurable course level objectives for each of the required courses for the program. The plan will also outline a process for setting student learning goals and objectives. Annual assessments will be conducted, and the outcomes will be used to identify the strengths and weaknesses of the program to guide faculty in making improvements to the program and student learning outcomes. In addition to the internal program and course review process, an external program review will be conducted every seven years.

Student course evaluations, course syllabi, course materials, exams, assignment criteria, and classroom peer observation will be used to evaluate faculty.

Consistency with the State’s minority student achievement goals and in the State Plan for Postsecondary Education

The MSFS program is committed to minority student achievement and overall success. The program is in conformance with the University’s long-standing commitment to the recruitment of a diverse student body. UB has proactively sought to identify multiple recruitment channels and communication strategies to ensure that there is outreach to a diverse population. The University also has a number of programs in place that will help the program’s diverse student body persist until graduation. The University continuously assesses the success of these programs and has developed an achievement gap plan to further increase minority graduation rates of students.

Quantifiable & Reliable Evidence and Documentation of Market Supply & Demand in the Region and State

The program, developed in consultation with the FBI, statewide law enforcement, and the chief executive officers at Citigroup Security, is intended for members of private corporations, nonprofit organizations, and governmental agencies who desire to advance their competencies in managing advanced technological resources to combat cyber threats, and related financial crime.
The most recent employment data (2010) from the Bureau of Labor Statistics affirms the demand for employees in cyber security related work, both within governments and in the public sector. The average salary for the greater Baltimore-Washington, DC-Northern VA areas, where statistics are taken, is over $96,000. In Maryland, 68,000 people are employed in security related occupations and a recent search of Indeed.com, a jobs website, indicates 342 job openings at all levels in cybersecurity, with 307 at starting salaries of $50,000 or more. Since 2010, the local presses have been reporting the increase in demand for qualified security personnel, revealing that private sector businesses in particular, are unable to hire “enough qualified workers” given “the tight pool of high-tech specialists and workers with government security clearances” (“Wanted Cybersecurity Pros” 1 August 2010 The Baltimore Sun). In addition, in February 2012, Sen. Barbara Mikulski presided at the opening of the new National Center for Excellence in Cybersecurity in Gaithersburg, MD with the purpose of encouraging partnerships between higher education, government, and private sector companies to educate students for evolving jobs in cyber security fields. Given the employment rates and the demand for new hires in this area, no one college, university, educational center or training program will be able to produce enough potential employees statewide. As noted in the February 2012 Southern Maryland Online article by Varun Saxena, “The creation of the National Cybersecurity Center of Excellence fulfills a goal identified in a 2010 strategic report on cybersecurity in Maryland” that emanated from the Governor’s office. Within this same spirit, UMUC developed their program in cyber security at the undergraduate and graduate levels. A review of their course offerings suggests the focus of their program is in keeping with the 2006 National Science and Technology Council report, The Federal Plan for Cybersecurity and Information Assurance Research and Development. In contrast to programs focused on protecting information from unauthorized access, UB’s program is centered around the “crime” that results from breaching information assurance protocols. UB’s proposed program is interdisciplinary and focuses specifically on forensic cyber analysis.

Reasonableness of Program Duplication

UB’s proposed program is interdisciplinary and focuses specifically on forensic investigations of high technology crime. The program extends and complements our existing undergraduate degrees in Criminal Justice and in Forensic Studies, Health Systems Management, and Business.

The MSFS degree program is a uniquely defined area within the forensic discipline because of its emphasis on high technology crime, particularly that which occurs within the workplace. Currently, there are no forensic Masters’ degree programs with an emphasis on High Technology Crime offered at any other USM institution, or any private or HBI institution within Maryland. There are two similar programs outside Maryland, one taught at the University of West Virginia and the other at George Washington University. Neither of these two programs impacts the catchment areas of the Baltimore region or Montgomery County.
Resources and Finance

Adequacy of Program Faculty

A combination of full-time faculty from the University of Baltimore and selected adjuncts from the commercial and government arenas with appropriate expertise and field experience will teach the courses.

The Forensic Program faculty are some of the finest professionals in the discipline, who have acquired decades of practical experience in the investigation and prosecution of crime. A complement of theoretical and practical expertise, forensic faculty work in metropolitan, state and national agencies, corporate and private industry, research with professionals from other countries and consult nationally and internationally. Many faculty are currently employed in law enforcement agencies, state’s attorney’s offices, forensic laboratories, and corporate and private security in the areas of fraud and high technology crime, with most serving in line and supervisory capacities. Qualified faculty include:

Charles Tumosa, Ph.D.
Professor Tumosa has close to a half century of experience as a Forensic Investigator. Charles Tumosa received his Ph.D. in Chemistry from Virginia Polytechnic Institute and State University in 1972. Dr. Tumosa retired from the Philadelphia Police Department’s Criminalistics Laboratory in 1989 and the Smithsonian Institution in 2006. Dr. Tumosa has authored over 100 publications in forensic science, conservation science, chemistry, and numismatics. Currently, Dr. Tumosa is a clinical professor and the Forensic Laboratory Director at the University of Baltimore. He teaches the Forensic Investigations, Forensic Evidence, Incident Response, Trace Analysis, and various electives courses in the area of fraud including Forensics and Art, and Introduction to Questioned Documents. Dr. Tumosa has taught at the University of Baltimore since 2007.

Ed Koch
Edgar Koch received a Bachelor’s of Science in Chemistry from Towson University and his Master’s of Science in Criminal Justice from the University of Baltimore in 1988. He was the first forensic chemist in Anne Arundel County (AACo), where he established the Police Department’s Crime Laboratory. Mr. Koch retired from AACo as Deputy Chief of Police in 1995. He subsequently became the Director of the Baltimore Police Department’s Crime Laboratory, where he served for approximately twelve years. Currently, he is a lecturer in the Criminal Justice and Forensic Studies programs at the University of Baltimore. In addition to criminal justice courses, Mr. Koch teaches Forensic Science, Evidence Collection, Crime Scene Investigation, Forensic Investigations, Incident Response, and Microscopy. He has taught at the University of Baltimore for ten years.

Berry Grant
Berry Grant received both his BA in Jurisprudence and MBA from the University of Baltimore. He developed the first Criminal Intelligence and Computer Crimes Unit for the Baltimore City Police Department in 1993. He trained the Computer Forensic Examiners and managed the unit until his retirement. Upon retirement from the Police Department, he went to serve as the Senior Fraud Investigator with the Municipal
Employees Credit Union and a Background Investigator with Omniplex International Investigations. Mr. Grant served as the Chairperson of the Fraud Investigations Council for the Maryland-Washington, D.C. Credit Union League. Mr. Grant teaches a variety of police and forensic courses as well as the Cyberintelligence specialization courses.

David Mabrey
David Mabrey received his law degree from the University of Baltimore in 1990. He was admitted to Maryland Bar the same year. Currently, he is an Assistant State’s Attorney for the District Court of Maryland for Baltimore City. In this capacity, Mr. Mabrey advises law enforcement on evidentiary issues, filing charges, and litigation procedures. He also trains new state’s attorneys in case preparation, trial strategies and evidence review. Mr. Mabrey also served as an Assistant State’s Attorney for the Circuit Court of Maryland for Baltimore City. In this position Mr. Mabrey tried homicide cases, fraud and identity theft crimes, developing legal strategies, consulting with medical examiners and conducting witness interviews. Mr. Mabrey has also served as a Faculty Advisor for Maryland State’s Attorneys Association Trial Advocacy Program. He has taught at the University of Baltimore for approximately twelve years. In addition to law and criminal justice courses, Mr. Mabreys teaches Fourth Amendment Application and Interpretation and the Specialty Warrants, Wiretaps and Historical Conspiracies, Legal Issues in High Tech Crimes, and Organizational Liabilities and Crime for the Forensic program.

John Pignataro
John Pignataro has a Master’s degree in Telecommunications and Computer Science from Polytechnic University. He is the Director of SIRT Investigations at Citigroup where he is responsible for all forensic investigations involving Computer and Digital Fraud for Citigroup in New York City. A former police Colonel for the Baltimore City Police Department, Deputy Superintendent for the Maryland State Police, and a Detective Sergeant for the New York City Police Department, Mr. Pignataro has more than 30 years’ experience as an expert Computer Fraud Investigator. Mr. Pignataro can teach the Cyberintelligence and Cryptanalysis specialization courses.

John Callahan, Ph.D.
Professor Callahan has more than 25 years of public service with the federal government, his last assignment being that of assistant secretary of management and budget for the U.S. Department of Health and Human Services from 1995-2001. Professor Callahan can teach the Health Care Fraud courses.

Phil Korb
Professor Korb is the chair of the Department of Accounting and is a CPA. He has a research interest in income taxation of individuals and estates and trusts. He is the faculty adviser for the Theta Iota Chapter of Beta Alpha Psi. He has extensive research and referred publications in the accounting field. Professor Korb can staff the Forensic Accounting specialization courses.

Adequacy of Library Resources

The materials students need are largely available through open source databases, governmental archives, or online through organizations like the Department of Justice, Police Research Foundation, Westlaw, or a variety of professional organizations and
businesses. Peer reviewed material in journals is easily accessible through Langsdale Library's existing library subscriptions.

*Adequacy of physical facilities, infrastructure and instructional equipment*

Courses with a lab component will have classroom space that will allow students to break down computer hardware and hard-wire computer workstations and special software tools. Initially, the computer lab may be portable, however in the near future a designated "computer lab" space should be available on both campuses.

*Adequacy of Financial Resources*

Given the rich environment of high technology organizations in the Baltimore/Washington area, it is anticipated that the program will attract an initial class of sixteen students in its first year. We also anticipate that students will take at least three years to complete this program assuming that they take 15 credit hours per year. Data on anticipated Program Resources can be found in Table 1.

Data in Table 2 shows anticipated expenditures for the new program. We anticipate that as the program grows, additional faculty lines will be made available. In addition, we are providing for a one-course release for the program director. As noted in the program proposal, we do not anticipate that new resources will be needed from the library as many of the topical areas relevant to this area are available through ResearchPort. Staff assistance to faculty will be provided through the Academic Program Specialist assigned to the School of Criminal Justice. Student advising will be undertaken through the College of Public Affairs Advising staff. *No new resources are being requested.*
Off-Campus Delivery of Program

The program will be offered at both the University of Baltimore and the Universities at Shady Grove campuses. As noted above, there are no existing programs offering this degree program. The workforce demand for an increase in the number of hires in the area of computer and digital forensic investigators surpasses the current capacity of qualified workers. According to the newly formed National Cybersecurity Center of Excellence, "given the employment rates and the demand for new hires in this area, no one college, university, educational center or training program will be able to produce enough potential employees statewide." Offering the program at both campuses will provide an opportunity to potential students from two entirely different geographical locations within the State of Maryland.

The proposed program will consist of core courses in forensic investigative techniques, cyber investigations, incident management, data protection, legal aspects of management, infrastructure protection, the globalization of crime, network security, fraud investigations, and data mining techniques. Presently, we are envisioning three specializations in the Master of Science in Forensic Science–High Technology Crime (MSFS) degree program that may include computer forensic analysis, incident management, and cyber investigations. Students at USG enrolled in either the Cybersecurity BS degree or the BS in Criminal Justice and Criminology will have a clear pathway to advanced studies in their fields with the addition of UB’s MS in Forensic Science-High Technology Crime. The proposed program, with its applied pedagogy, features interactive learning not replicable in a virtual environment. Students already enrolled in programs at USG in science, nursing, business, and computer science, as well those in the undergraduate criminology and criminal justice programs may be interested in the professional pathways this program offers. The Forensic Accounting specialization will not initially be offered at USG.

All courses will be taught in a classroom with a strong emphasis on interactive learning. A mix of both full and part-time on-site faculty from the Schools of Criminal Justice, Business, and Health and Human Services will deliver the program.

Academic Advisors from the College of Public Affairs and the Merrick School of Business will provide student support.
COURSE DESCRIPTIONS
M.S. in Forensic Science – High Technology Crime
University of Baltimore

Forensic Science Courses

FSCS 601  Legal Issues in High Technology Crimes  3 credits
Examines the general regulations, general and computer-related law, and ethics
and business policies associated with high technology crime. Areas of major focus
include description of legal issues facing management and administration,
traditional search and seizure as well as privacy issues, manager and supervisor
responsibilities, criminal issues and definitions, chain of custody and ethical
considerations. Problem-oriented course that focuses on applying the holdings of
cases and analyses of statutes to different criminal fact patterns.

FSCS 610  Identifying Organizational Liabilities & Crime  3 credits
Defines problems, logic and theory, research protocols, personal and
organizational risks, criminal and civil liabilities, physical security issues, due
diligence matters, and environmental concerns and sexual harassment issues.
Covers responsibilities of the organization and of the individual.
prerequisite: FSCS 601

FSCS 615  Information Retrieval: Paper and Electronic  4 credits
Explores gathering of information and data, evidence collection, storage and
security of records, personnel records and related issues, privacy issues, security
of customer information, duties and obligations of the information technology
field. Also focuses on legal access to these records.  prerequisite: FSCS 601

FSCS 620  Forensic Investigative Techniques I  4 credits
Focuses on traditional investigative techniques (interviews and interrogations),
simple data collection, physical evidence, fraud detection, data acquisition and
computer techniques, reverse engineering and industrial espionage. Also
examines administrative process, the role of human resources and accounting,
organizational processes and structures and chain of command/management.
Intended as an introduction to FSCS 720.  prerequisite: FSCS 601

FSCS 630  Introduction to Cryptanalysis  3 credits
Provides the historical basis for ciphers and encryption techniques and examines
the use of codes in government and commercial applications. Also explores
decryption techniques as applied to businesses and to government.

FSCS 635  Image Analysis  3 credits
Examines the effective manipulation of digital images from digital photographs
and videotapes. Discusses identification of authenticity and detection of
manipulation in addition to detection of fraud and other criminal activity in these
digital media.  prerequisite: FSCS 630
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>FSCS 640</td>
<td>Steganography</td>
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<tr>
<td></td>
<td>Steganography is a process by which information is hidden within other media.</td>
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<td>Presents tools (software) to detect such hidden information, including files,</td>
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<td>images, network traffic, disks, etc., that masquerade within any system. Also</td>
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<td>presents the processes of hiding or encrypting data to inhibit a forensic analysis</td>
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<td></td>
<td>and of the detection and counter-resolution of hidden information.</td>
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<td><strong>prerequisites:</strong> FSCS 630 and 635</td>
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<tr>
<td>FSCS 720</td>
<td>Forensic Investigative Techniques II</td>
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<td></td>
<td>A continuation of FSCS 620 with special attention on computer systems and</td>
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<td></td>
<td>network systems.</td>
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<td><strong>prerequisite:</strong> FSCS 620</td>
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<tr>
<td>FSCS 724</td>
<td>Protection of Data/Information</td>
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<td></td>
<td>Examines prevention of data/information loss by theft, intrusion and natural</td>
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<td>disaster and assessment of vulnerabilities and their remediation. Also presents</td>
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<td>protocols for security and for effective data storage and examines assessment</td>
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<td>of risk. <strong>prerequisite:</strong> FSCS 615</td>
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<tr>
<td>FSCS 727</td>
<td>Computer and Digital Forensics</td>
<td>3</td>
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<td></td>
<td>Examines the use of specialized techniques for recovery, authentication and</td>
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<td>analysis of electronic data; reconstruction of computer usage; examination of</td>
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<td>residual data; and authentication of remaining data. <strong>prerequisite:</strong> FSCS 601</td>
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<td>FSCS 728</td>
<td>Information Systems, Threats, Attacks and Defense Strategies</td>
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<td>Examines information systems and the threats from malicious activities that</td>
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<td>attempt to collect data from or disrupt, deny or destroy information within a</td>
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<td>system. Also explores origins of such attacks and effective responses to threats.</td>
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<td><strong>prerequisite:</strong> FSCS 615 and FSCS 727</td>
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<td>FSCS 730</td>
<td>Incident Response I</td>
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<td>Explores the development of effective responses to active attacks on computer</td>
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<td>systems and networks, coupled with analysis of the breakdown of protective</td>
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<td>measures. <strong>prerequisite:</strong> FSCS 724</td>
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<td>FSCS 734</td>
<td>Incident Response II</td>
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<td>Explores the management of emergency situations arising from natural disasters</td>
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<td>or civil disorder and the development of proper planning. Provides training in</td>
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<td>the proper maintenance of computer systems and networks that involve both the</td>
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<td>technical and physical security of systems, physical plant and personnel.</td>
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<td><strong>prerequisite:</strong> FSCS 734</td>
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<tr>
<td>FSCS 740</td>
<td>Internship</td>
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<td>Provides field experience to students through laboratory assignments with various</td>
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<td>forensic or criminal justice entities. Course is completed at the end of the</td>
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<td>program and requires submission of a journal and research paper. Eligible for</td>
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<td>continuing studies grade. <strong>prerequisites:</strong> Successful completion of all core</td>
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<td>courses in M.S. in Forensic Science program and permission of program director.</td>
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FSCS 750  **Capstone Project**  3 credits
Capstone course requires students to integrate and apply knowledge, theories, principles, skills and practical applications learned in FSCS core courses to actual high technology case scenarios.  *prerequisites: Successful completion of all core courses in M.S. in Forensic Science program and permission of program director.*

FSCS 753  **Computer and Digital Security Management**  3 credits
A study of the management of networks, types and sources of threats and vulnerabilities, risk management, firewalls and other security issues.  
*prerequisites: FSCS 615, 727, and 728*  

### Accounting Courses

**ACCT 601  Forensic Accounting Principles**  3 credits
Provides an overview of the field of forensic accounting focusing on the roles, responsibilities and requirements of a forensic accountant in both litigation and fraud engagements. Examines basic litigation and fraud examination theory, identifies financial fraud schemes, explores the legal framework for damages and fraud and damage assessments and methodologies, and reviews earning management and financial reporting fraud. Other topics include computer forensics and corporate governance and ethics. Actual litigation and fraud cases are used to highlight the evolving roles of forensic accounting.  
*prerequisite: ACCT 504 or equivalent*

**ACCT 603  Investigative Accounting and Fraud Examination**  3 credits
Topics include the in-depth review of sophisticated fraud schemes, how fraudulent conduct can be deterred, how allegations of fraud should be investigated and resolved, the recovery of assets, methods of writing effective reports, and complying with SAS 82 and other fraud standards. Fraud and investigation topics cover acts of skimming, cash larceny, check tampering, register disbursement schemes, billing schemes, payroll and expense reimbursement schemes, improper accounting of inventory and other assets, corruption, bribery, conflicts of interest, security fraud, insurance fraud, anti-terrorist financing and money laundering.  
*prerequisite: ACCT 504 or equivalent*

**ACCT 604  Litigation Support**  3 credits
Addresses the relationship between the forensic accounting professional and the litigation process in which he or she may play a role. Specifically, this course covers the litigation process, the legal framework for damages and fraud, damage assessment methodologies, issues related to the presentation of evidence through expert testimony, practices used in supporting divorce cases and basic rules of evidence as they apply to forensic accountants.  
*prerequisite: ACCT 504 or equivalent*
Health Management Courses

HSMG 698 Health Care Fraud and Detection Analysis 3 credits
Designed to familiarize students with the work of major federal health programs such as Medicare, Medicaid and the Children’s Health Insurance Program. Identifies patterns of improper and fraudulent payments to providers in these programs, describes the forensic investigative techniques necessary to uncover fraudulent financial transactions such as payments, and examines the means to recover payments and to reduce future fraudulent practices.

HSMG 691 Health Planning and Evaluation 3 credits
Explains the theoretical and historical foundations of health planning, the relationship between health planning and regulations, and the application of planning methods. Students gain an essential understanding of the basic structure and operations of health-care programs to determine the various points in the program at which fraud might occur.

HSMG 702 Special Analysis and Health Care Fraud 3 credits
Provides a full understanding of major health-care fraud investigations conducted by the U.S. Department of Health and Human Services, Office of the Inspector General, and the U.S. Department of Justice Criminal Division. Students study the structure and operation of the Office of the Inspector General and its annual audit activities related to specific health-care programs as well as relevant reports issued by the General Accountability Office pertaining to health-care program improvements that could mitigate health-care fraud.