

**Proposal for a Master of Science in Medical Sciences  
Program Policy Statement**

Presented to the Faculty Senate

University of Delaware

Newark, DE 19716

By Esther E. Biswas-Fiss, Ph.D., MB(ASCP)

Professor and Chair

Department of Medical Laboratory Sciences

October 26, 2016

This proposal requests approval for a non-thesis MS degree in Medical Sciences (MMS). This degree will be offered through the Department of Medical Laboratory Sciences.

## **I. Program History and Description**

### **A. Statement of purpose and expectation of graduate study in the program**

The Master of Science in Medical Sciences (MMS) is designed for practicing professionals who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology. In today's competitive employment market, individuals seeking management and leadership positions in the laboratory-based health professions require a graduate level degree. The MMS will allow students to specifically tailor their program of study to meet their specific career goals whether it be laboratory administration, research or laboratory science education. In addition, the curricular flexibility of this program will allow laboratory professionals to gain knowledge and technical competency in emerging areas of practice in the laboratory such as molecular diagnostics.

The MMS is designed for individuals holding a baccalaureate degree in a laboratory field with an interest in advancing theoretical and clinical learning, practice, and research. The program prepares the student for advanced practice opportunities with academic, industrial and clinical professional growth through:

- advanced expert-knowledge and skills
- critical thinking proficiency
- interdisciplinary collaboration through a focused advanced practica
- increased skills in evidence-based practice, and research methodologies
- conduct of translational research in laboratory science

Individuals seeking leadership positions in laboratory management, education and research will earn an MS in Medical Sciences, through either full- or part-time study. Students must have a BS or a post-baccalaureate certificate in a laboratory field such as

medical laboratory sciences, biotechnology, cytogenetic technology or cytotechnology. (Other laboratory professionals may be eligible, based on training and experience.) The program is **customized** to each student's unique interests and professional goals.

An overarching goal of this program is to provide a cadre of leaders in the laboratory based health professions. The new program aligns with the vision of the University of Delaware as a center for graduate level professional education and training.

*Outcomes for the MMS include the expectation that students will be able to:*

- Critically review, appraise and synthesize the health sciences literature;
- Identify and systematically investigate research questions pertinent to clinical laboratory practice;
- Synthesize new concepts, models and theories through the appropriate application of empirical knowledge and the scientific method to help resolve clinical laboratory and health sciences issues or problems;
- Apply the advanced knowledge and technical skills needed to serve as active contributors and/or leaders in the laboratory science professions;
- Apply current knowledge to evaluate or design more effective ways to deliver clinical laboratory and health-related services;
- Use a variety of information technologies to address both theoretical and practical problems, enhance communication, and disseminate knowledge to applicable audiences and interest groups;
- Demonstrate proficiency in both oral and written communication, using both scholarly and technical formats;
- Work collaboratively with others to advance the scientific bases of knowledge in clinical laboratory science via ongoing scholarship;
- Integrate basic principles of ethics and cultural sensitivity within all interpersonal and professional activities.

The proposed new major is compatible with the academic priorities of the University by supporting the initiative of creating a diverse and stimulating undergraduate

academic environment. This new program aligns with the UD Path to Prominence *One Health Initiative* where the University desires to expand its graduate level health and medical education programs.

### **B. Current Status**

This proposal requests approval for a non-thesis MS degree in Medical Sciences (MMS).

### **C. Degrees Offered**

MS in Medical Sciences

## **II. Admission**

Admission to the graduate program is competitive. Those who meet stated minimum requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer appropriate strengths.

### **Admission Requirements**

**Expected Minimum Requirements for Admission into the Medical Sciences Program** - Admissions decisions are made by the Medical Sciences Program Committee. Students will be admitted to the program based on enrollment availability and their ability to meet the following minimum recommended entrance requirements:

- BS, equivalent degree or post-baccalaureate certificate in a laboratory profession (such as medical laboratory sciences, biotechnology, cytogenetic technology or cytotechnology; other laboratory professionals may be eligible, based on training and experience) from an accredited college or university.
- The GRE is not required, TOFEL requirements are described in detail below for international applicants
- An undergraduate GPA of 3.0 or higher.

- Written statement of goals and objectives (the personal statement) that clearly identifies the applicant's research and curriculum interests and explains how admission to the program will facilitate his/her professional objectives.
- Current résumé and two letters of recommendation.

All students will be expected to be sufficiently conversant in English and knowledgeable in the written word to convey clear, logical and complex written expressions.

**Admission Procedures** - Applicants must submit all of the following items directly to the University Office of Graduate Studies using the online admission process before admission can be considered:

1. A completed application should be submitted no later than February 1 for the fall semester, and October 1 for the spring semester to ensure consideration.
2. A nonrefundable application fee must be submitted with the application. Credit card payment is accepted with the online application. Checks must be payable to the University of Delaware. Applications received without the application fee will not be processed. International students paying by check must use a check drawn on a US bank or an International Postal Money Order.
3. Applicants must submit responses to specific questions asked on the application; a resume; and a statement of professional goals and objectives.
4. Applicants must submit at least two letters of recommendation. All letters of recommendation should be mailed directly to the Office of Graduate Studies.
5. One official transcript of all US colleges and universities attended must be sent directly from the institution to the Office of Graduate Studies or be provided in a sealed

envelope with the application packet. Students who have attended the University of Delaware need not supply a transcript from Delaware.

6. One official transcript of all non-US based college and university records is required. The transcript must list all classes taken and grades earned. If the transcript does not state that the degree has been awarded, send a degree certificate that states that the degree has been awarded. If the degree has not been awarded or the degree certificate has not been issued, evidence of the awarded degree must be provided prior to the first day of classes in the term of admission. For institutions that issue documents only in English, send the English original. For institutions that issue documents both in English and a foreign language, send both the English language original and the foreign language original. For institutions that issue documents only in a foreign language, send the foreign language original and a certified translation in English. The translation must be certified by an official of the issuing institution, a state- or court-appointed translator, or the Embassy of the issuing country in the United States. If it is necessary to send non-original documents: a. The documents must be original “attested copies”, officially attested to by the issuing institution or the Embassy of the using country in the United States, and b. Certified translations must be originals, no copies will be accepted.

7. International student applicants must demonstrate a satisfactory level of proficiency in the English language if English is not the first language. The Test of English as a Foreign Language (TOEFL) is offered by the ETS in test centers throughout the world. The University requires an official paper-based TOEFL score of at least 550 or at least 79 on the Internet-based TOEFL for an applicant to be considered for admission. TOEFL scores more than two years old cannot be validated or considered official.

8. International students must be offered admission to the University and provide evidence of adequate financial resources before a student visa will be issued. The

University has been authorized under federal law to enroll nonimmigrant alien students. International students are required to purchase the University-sponsored insurance plan or its equivalent.

9. All first-time international students are required to attend the Orientation Day for new international students, which takes place before classes begin.

10. It is a Delaware State Board of Health regulation and a University of Delaware mandate that all graduate students with a birth date after January 1, 1957, be immunized for measles, mumps and rubella (MMR). Also, students may be required to provide evidence of PPD (Mantoux) Tuberculosis Screening Test within 6 months prior to beginning classes. Students who are admitted beginning January 2002 are required to show proof of vaccination against meningococcal disease unless granted a waiver. Students should refer to and complete the Student Health Service Immunization Documentation form upon admission.

**Admission Application Processing** - Applications will be processed as they are submitted. The admission process is completed as follows: First, completed applications consisting of the application form, undergraduate/graduate transcripts, letters of recommendations, resume, statement of purpose, and written statement of goals and objectives are reviewed by the Program Committee of the Medical Sciences Program. The Program Committee arrives at an admission decision after reviewing the completed application. Students are notified in writing of the admissions decision within two weeks of the decision. There is only one category of admission – there is no provisional admission to the MMS. *Nota bene* - admission to the MS in Medical Sciences does not confer admission to the Ph.D. in Medical Sciences, which is a distinct graduate program offered through the College of Health Sciences.

### **III. Academic**

#### **A. Degree Requirements**

The MS in Medical Sciences (MMS) is built on 32 – 34 graduate credits that include both core courses, fieldwork experiences and individualized concentration electives.

The curriculum can be completed in as little as three semesters (accelerated format), in a traditional four semester format, or in an extended part-time format over the course of six-semester.

#### Core Courses

- Methods in Bioscience Education
- Research Design
- Research or Capstone Project
- Laboratory Administration Fieldwork
- Laboratory Education/Instruction Fieldwork
- Regulatory and Fiscal Issues in Lab Management

Select 6-8 credits of concentration electives from graduate level courses offered throughout the University. These courses should focus on and reflect contemporary areas of clinical or research laboratory management, administration and advanced practice.

Concentration Areas include but are not limited to:

- management and supervision
- financial management
- regulatory and quality management
- advanced research skills
- population health

#### **MS in Medical Sciences: Curriculum**

#### **SEMESTER CREDITS**

#### **CORE COURSES (12 credits)**

MEDT 603	Research Design	3
MEDT 604	Methods in Bioscience Education	3
MEDT 605	Regulatory and Fiscal Issues in Laboratory Management	3
MEDT 803	Seminar (3 total, 1 per semester – 1.0 credit each)	3



**FIELDWORK EXPERIENCES (8 credits)<sup>1</sup>**

MEDT 611	Advanced Practicum I	2
MEDT 612	Advanced Practicum II	2
or		
MEDT 631	Laboratory Education Administration and Instruction*	2
MEDT 613	Advanced Practicum III	2
MEDT 614	Advanced Practicum IV	2
or		
MEDT 632	Laboratory Administration and Management	2

**SCHOLARLY PRODUCT & CONCENTRATION ELECTIVES (12-14)<sup>2,3</sup>**

MEDT 868	Research (2 total, 3 credits each)	6
or		
MEDT 815	Contemporary Topics Research (2 total, 3 credits each)	6
Concentration Elective(s) <sup>3</sup>		6-8

**Total Credits for the Master of Science in Medical Sciences**      minimum 32

<sup>1</sup>Students must earn 8 credits in the fieldwork experiences category through an individualized combination of the following courses: Advanced Practica, Laboratory Education and Administration, Laboratory Administration and Management).

<sup>2</sup>To meet the scholarly product requirement, students may take a literature review/health services/ outcomes based research project course (MEDT 800) or engage in a wet-bench research project with a selected PI (MEDT 868). Students must meet with the MMS program director to determine which course best meets their educational needs.

<sup>3</sup>See Table 1 for a list of potential concentration elective courses. Selections are tailored to meet each student's educational goals.

**Table 1 - POTENTIAL CONCENTRATION ELECTIVE COURSES**

MEDT608	Molecular Preparatory Techniques	2
MEDT625	Basic Molecular Techniques	4
MEDT 690	Genetics and Molecular Diagnostics	3
MEDT 691	Molecular Diagnostics	3
MEDT 692	Application of Molecular Diagnostic Techniques	3
MEDT651	Cell and Tissue Culture Techniques	4
MEDT 627	Introduction to Flow Cytometry	2
MEDT635	Practical Genomic, Proteomics and Bioinformatics	3
MEDT626	Protein Purification & Characterization	3
KAAP655	Advanced Physiology of Exercise	3
KAAP680	Exercise, Nutrition and Bone Health	3
KAAP802	Human Cardiovascular Control	3
KAAP840	Advanced Human Anatomy	3
MEDT805	Biomarker Development	3
MEDT810	Evidence Based Practice	3
NTDT610	Overweight/Obesity Prevention and Management	3
NTDT611	Advanced Nutrition	3
NTDT630	Trace Minerals & Vitamins	3
NTDT640	Nutrition and Aging	3
NTDT655	Issues in International Nutrition	3
NURS621	Advanced Pathophysiology	3
NURS812	Responsible Conduct of Research	1 (online, fall)
BINF644	Bioinformatics	3
CISC636	Bioinformatics	3
CHEM641	Biochemistry	3
CHEM642	Biochemistry	3
EDUC856	Introduction to Statistical Inference	3

**2. Residency Requirement.** At least three academic year semesters of graduate work are required for the MS degree. This residency requirement may be fulfilled using fall and spring semester combinations, summer and winter sessions do not meet the qualifications.

**3. Course Substitutions.** Courses in the core curriculum may not be substituted. Concentration electives will be chosen in consultation with the program director in accordance with the student's career goals. Transfer graduate coursework cannot count towards the degree.

#### **B. Committees for exams, thesis or dissertations**

N/A - the MMS is a non-thesis MS degree

#### **C. Time Limit for Completing the Degree & Definition of Satisfactory**

##### **Academic Progress**

**1. Timetable.** The time limit for completion of degree requirements begins with the date of matriculation and is specifically detailed in the student's letter of admission. Students entering the program are given 6 consecutive semesters to complete the program requirements. An extension of time limit may be granted for circumstances beyond the student's control. Requests for time extensions must be made in writing and approved by the student's dissertation committee and the director of the Medical Sciences Program. The director will forward the request to the Office of Graduate studies.

**2. Submission of Required University Forms.** To initiate the process for degree conferral, candidates must submit an "Application for Advanced Degree" to the Office of Graduate Studies. The application deadlines are February 15 for Spring candidates, January 15 for Winter candidates, May 15 for Summer candidates, and September 15 for Fall candidates. The application must be signed by the program director and department chair. There is an application fee of for master's degree candidates that is published by the university. Payment is required when the application is submitted.

Upon completion of the audit, the Office of Graduate Studies notifies students in writing when they have met all degree requirements.

**3. Grade Requirements for Satisfactory Progress.** Failure to satisfactorily progress in the program will be based on the University Graduate Policy as noted below: The Office of Graduate Studies monitors the academic progress of all graduate students and notifies students in writing of all academic deficiencies. The cumulative GPA after each 9-hour increment determines academic standing. The University's Academic Probation Policy is expressed in the following chart

If student is on:

<b>If a student is on</b>	<b>Earns a GPA of</b>	<b>The status becomes</b>
Any status	3.0 or above	Clear
Clear	2.99-2.5	Warning
Clear	2.49-2.	Probation
Probation	Below 3.0	Dismissal
Warning	Below 3.0	Probation
Any status	Below 2.0	Dismissal

**4. Reasons for Dismissal/Termination from the Program.** The Office of Graduate Studies notifies students when they are dismissed from graduate programs without completing a degree. Dismissals usually take place at the end of a term. Students may be dismissed for the following reasons:

- Upon the expiration of the three-year time limit required for students to complete their degree.
- Upon the failure to meet the grade point average requirements as stated in the policy on Academic Deficiency and Probation.

#### **IV. Evaluation**

Faculty who will be affiliated with the program plan to work with the UD Center for Educational Effectiveness in spring 2017 to fully develop the program's assessment plan. This work will entail the development of a curriculum map to align selected courses with the intended learning outcomes of the program.

**Direct Measures.** Four Learning Outcomes have been identified for the program. Upon completion of the program, all students will:

1. Employ research methods to assess a problem in the field of medical science in an ethical manner. Course Assessed: MEDT 603 *Research Design*
  
2. Communicate research findings in an effective manner. Course Assessed: MEDT 803 *Graduate Seminar*
  
3. Demonstrate the ability to quantitatively analyze data using several different statistical procedures. Course Assessed: MEDT 868 *Experimental Research* or MEDT 800 *Contemporary Topics Research*
  
4. Evaluate and assess regulatory and fiscal situations encountered in laboratory settings and make best-practice, evidence based recommendations. Course Assessed: MEDT 605 *Regulatory and Fiscal Issue in Laboratory Practice*

#### **Indirect Measures.**

##### **Alumni Surveys Six Months, One-Year and Five-Year Post-Graduation**

Surveys of graduates will be conducted one-year and five-year post-graduation. The surveys will focus on two major areas: program/education effectiveness and demographic information pertaining to employment status and/or graduate/professional school enrollment.

### **Field Experience Supervisor Surveys**

Upon completion of the field experience(s), the field experience supervisor will complete a rubric designed to assess the affective skills demonstrated by the student.

### **V. Financial Aid**

There are no additional costs for the students in this program other than traditional graduate student tuition and fee expenses. This is a tuition generating graduate program and tuition remission and/or stipends are not offered. Graduate students in this program would be eligible to apply for financial aid as applicable.

### **VI. Departmental Operations**

This program will start in the fall of 2017. We initially anticipate approximately 10-15 students following this course of study each year. Three tenure track faculty lines in areas relating to the MMS have been approved, and an active faculty search is underway with a start goal of August 2017. These faculty will have primary teaching responsibility for the MMS core curricular courses. Existing departmental faculty will also participate in the program (Table 2).

**Table 2 - Current Faculty Affiliated with the Program**

<b>Name</b>	<b>Degree</b>	<b>Rank</b>	<b>Specialty</b>
Susan J. Hall	Ph.D.	Deputy Dean	Administration
Leslie Allshouse	M.Ed., M.B.A.	Instructor	Immunohematology
Esther Biswas-Fiss	MS, Ph.D.	Professor and Department Chair	Molecular Diagnostics & Biotechnology
Arun Kumar	Ph.D.	Assistant Professor	Nanotechnology/ Clinical Chemistry
Huey-Jen Lin	Ph.D.	Associate Professor	Molecular Diagnostics

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Donald Lehman	Ed.D.	Associate Professor	Medical Microbiology
Raelene Maser	Ph.D.	Associate Professor	Hematology
Mary Ann McLane	Ph.D.	Professor	Clinical Chemistry
Michelle A. Parent	Ph.D.	Associate Professor	Medical Microbiology/ Molecular Biotechnology

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**Graduate Coordinator.** The MLS department chair will appoint a graduate coordinator for the Medical Sciences Master's Program from among the department faculty. The term of service for the graduate coordinator is three years, with no limit on the number of consecutive terms that may be served. The graduate coordinator serves as the program representative and point person and is responsible for the following:

- Corresponding with prospective students
- Maintaining program records
- Holding elections for members of the Program Committee
- Chairing Program Committee meetings
- Admitting students to the program following approval of the Program Committee
- Chairing meetings of the Medical Sciences faculty as necessary for review/revision of program policies and curriculum
- Final approval of degree granting

**Program Committee.** The Medical Sciences Graduate Program Committee will consist of an affiliated faculty member from the department, serving in staggered, three-year terms. The graduate program coordinator will serve as chair of the Program Committee. Responsibilities of the Program Committee shall include:

- Admission of students into the program
- Approval of changes to the graduate curriculum

- Oversight of student progress in the program, including dismissal of students who fail to make satisfactory progress

### **Medical Sciences Students**

- A. Student Organization.** Students in the program will be encouraged to periodically meet as a group so that the student representative can pass on any pertinent information from program meetings and so the group can discuss any issues or concerns they might have. Concerns can be brought to the attention of the program faculty by the elected student representative.
- B. Laboratory Safety and Research Regulations and Standards of Student Conduct.** Graduate students performing laboratory research are subject to all University regulations regarding safety, human subjects, animal use, and hazardous and radioactive material use and disposal. These guidelines may be found in the University of Delaware Policies and Procedures Manual. Additional information can be obtained from the UD Research and Graduate Studies website: <http://www.udel.edu/research/> All training and regulatory authorizations must be updated at the time of proposal submission.
- C. Travel.** Students will be encouraged to attend regional scientific meetings and symposia. Funding will be sought from available University/College/departmental funds should a student attend a conference for the purpose of presenting a peer-reviewed poster or to play a leadership role in the conference.

### **VIII. Appendices**

Letters of Approval College of Health Science Administration – See attached



## **Appendix 1 – Letter of Support**



College of Health Sciences

OFFICE OF THE DEAN

345 McDowell Hall  
Newark, DE 19716-3710  
Phone: 302-831-2381  
Fax: 302-831-3490

October 31, 2016

Dear curriculum approvers:

I am pleased to write in strong support of the proposed Master of Science in Medical Sciences. This degree is designed for practicing professionals who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and the fast-paced development of technology.

Our undergraduate major in Medical Laboratory Sciences has long been the primary supplier of MLS professionals for the surrounding hospitals and pharmaceutical industry. Completion of the proposed M.S. degree will enable these professionals to advance their careers by qualifying for administrative and other advanced level kinds of positions. There is clearly a strong market for the program and its launching will be appreciated by MLS professionals and their employers alike.

Sincerely

A handwritten signature in cursive script that reads 'Susan J. Hall'.

Susan J. Hall  
Deputy Dean, College of Health Sciences



Esther Biswas &lt;ebiswas@udel.edu&gt;

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**URGENT - Email of support for graduate electives**

8 messages

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**Esther Biswas** <ebiswas@udel.edu>  
To: mccoym@udel.edu

Tue, Nov 8, 2016 at 9:13 AM

Good morning Dr. McCoy,

The Department of Medical Laboratory Sciences is proposing a new MS program in Medical Sciences (MMS) designed for practicing professionals (Medical Laboratory Scientists, Cytotechnologists, Cytogeneticists, etc.) who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology.

The curriculum asks that students complete six elective credits in areas that are of interest to their professional growth. I have formulated a list of potential electives based on our current list of possible electives for students in our existing Ph.D. program in Medical Sciences (see attached). I am writing to inquire whether you would have any objection to students in the MMS program selecting the following course offered by your department as an elective:

BINF644 Bioinformatics

If you agree, I would appreciate for the purposes of review by the Faculty Senate, an email indicating that you have no objection for MMS students choosing the above course as an elective. I apologize for the lateness of this request, I recently joined UD and had not realized that we need letters of support for elective courses proposed in new graduate programs.

Thank you for your support.

Best regards,

--

**Esther E. Biswas-Fiss, MS, Ph.D., MB(ASCP)CM**

Professor and Chair  
Department of Medical Laboratory Sciences  
University of Delaware  
305K Willard Hall Education Building  
16 W. Main Street  
Newark, DE 19716  
[ebiswas@udel.edu](mailto:ebiswas@udel.edu)  
302-831-2912  
(856) 625-8300 cellular

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Esther Biswas &lt;ebiswas@udel.edu&gt;

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## Email of support for graduate electives

2 messages

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**Esther Biswas** <ebiswas@udel.edu>  
To: Murray Johnston <mvj@udel.edu>

Tue, Nov 8, 2016 at 9:30 AM

Good morning Dr. Johnston,

I hope that this email finds you well. The Department of Medical Laboratory Sciences is proposing a new MS program in Medical Sciences (MMS) designed for practicing professionals who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology.

The curriculum asks that students complete six elective credits in areas that are of interest to their professional growth. I have formulated a list of potential electives based on our current list of possible electives for students in our existing Ph.D. program in Medical Sciences (see attached). I am writing to inquire whether you would have any objection to students in the MMS program selecting any of the following courses offered by your department as their electives?

CHEM641 Biochemistry  
CHEM642 Biochemistry

If you agree, I would appreciate for the purposes of review by the Faculty Senate, an email indicating that you have no objection for MMS students choosing the above courses as electives.

Thank you for your support.

Best regards,

Esther

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**Esther E. Biswas-Fiss, MS, Ph.D., MB(ASCP)CM**

Professor and Chair  
Department of Medical Laboratory Sciences  
University of Delaware  
305K Willard Hall Education Building  
16 W. Main Street  
Newark, DE 19716  
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302-831-2912  
(856) 625-8300 cellular

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**Murray Johnston** <mvj@udel.edu>

Mon, Nov 14, 2016 at 8:47 AM

11/18/2016

University of Delaware Mail - Email of support for graduate electives

To: Esther Biswas <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
Cc: Sandeep Patel <[sapatel@udel.edu](mailto:sapatel@udel.edu)>

Dear Ester,

Thanks very much for your message. I have no objection to the listing of these courses as electives for your program, and indeed we welcome your students to these courses.

Best,  
Murray

Murray V. Johnston  
Professor and Chair  
Department of Chemistry and Biochemistry  
University of Delaware  
Newark, DE 19716

Office: Brown Laboratory, Room 102C  
Phone: [302.831.1247](tel:302.831.1247)  
Fax: [302.831.6335](tel:302.831.6335)  
Email: [mvj@udel.edu](mailto:mvj@udel.edu)  
Internet: [www.udel.edu/chem/johnston/](http://www.udel.edu/chem/johnston/)

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**Cathy H Wu** <wuc@udel.edu>

Tue, Nov 8, 2016 at 10:40 AM

To: Kathleen McCoy <mccoy@udel.edu>

Cc: Esther Biswas <ebiswas@udel.edu>

Hi Kathy,

Yes, I approve "BINF644 Bioinformatics" to be listed as an elective for the MMS.

Indeed, I would highly recommend they also list "BINF694 System Biology I" as an elective. This course has also been taken by their PhD students and offers critical data analytics skills needed for analyzing the next-generation sequencing (NGS) data increasingly being used for medical diagnostics.

Best, Cathy

On 11/8/2016 9:19 AM, Kathleen McCoy wrote:

Hi Cathy - I just wanted to check that this was ok with you.

Thanks  
Kathy

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Kathleen. F. McCoy  
Professor and Chair  
Computer and Information Sciences  
101J Smith Hall  
University of Delaware  
Newark, DE 19716  
[mccoy@udel.edu](mailto:mccoy@udel.edu)  
Phone: 302-831-2711

Begin forwarded message:

**From:** Esther Biswas <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
**Date:** November 8, 2016 at 9:13:47 AM EST  
**To:** [mccoy@udel.edu](mailto:mccoy@udel.edu)  
**Subject:** URGENT - Email of support for graduate electives

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Cathy H. Wu, Ph.D.

Edward G. Jefferson Chair of Bioinformatics & Computational Biology  
Professor, Departments of Computer & Information Sciences and Biological Sciences  
Director, Center for Bioinformatics & Computational Biology (CBCB)  
Director, Master's Programs in Bioinformatics & Computational Biology  
Director, PhD Program in Bioinformatics & Systems Biology  
Director, Protein Information Resource (PIR)  
Program Coordinator, Delaware INBRE  
University of Delaware  
Newark, DE 19711-5449

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**Kathleen McCoy** <[mccoy@udel.edu](mailto:mccoy@udel.edu)>  
To: Esther Biswas <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>

Tue, Nov 8, 2016 at 10:58 AM

Yes - CIS is happy to approve this course as an elective course in the MS Program in Medical Sciences.

Indeed, you may consider also listing "BINF694 System Biology I" as an elective. This course offers critical data analytics skills needed for analyzing the next-generation sequencing (NGS) data increasingly being used for medical diagnostics.

Best wishes,  
Kathy

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Kathleen F. McCoy  
Professor and Chair  
Computer and Information Sciences  
101J Smith Hall  
University of Delaware  
Newark, DE 19716  
[mccoy@udel.edu](mailto:mccoy@udel.edu)  
Phone: 302-831-2711

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: Kathleen McCoy <[mccoy@udel.edu](mailto:mccoy@udel.edu)>

Tue, Nov 8, 2016 at 12:20 PM

Excellent - thank you for your rapid response. I appreciate the Systems Biology suggestion, and will make students aware of it.

Have a wonderful day,

Esther

[Quoted text hidden]

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: Cathy H Wu <[wuc@udel.edu](mailto:wuc@udel.edu)>

Tue, Nov 8, 2016 at 12:21 PM

Excellent - thank you for your rapid response. I appreciate the Systems Biology suggestion and will make students aware of it.

Have a wonderful day,

Esther

[Quoted text hidden]

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: Kathleen McCoy <[mccoy@udel.edu](mailto:mccoy@udel.edu)>

Tue, Nov 8, 2016 at 1:11 PM

Dear Dr. McCoy,

Thank you for your rapid response regarding BINF 644 and suggestions of additional courses the students may be interested in. In my earlier email, I neglected to request permission to add *CISC 636 Bioinformatics* to the list of potential electives our MS in Medical Sciences students could register for.

Please advise.

Best regards,

Esther

[Quoted text hidden]

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**Kathleen McCoy** <mccoy@udel.edu>  
To: Esther Biswas <ebiswas@udel.edu>

Tue, Nov 8, 2016 at 1:13 PM

Yes - CIS also supports CISC636 on the list of electives.

Kathy

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Kathleen F. McCoy  
Professor and Chair  
Computer and Information Sciences  
101J Smith Hall  
University of Delaware  
Newark, DE 19716  
[mccoy@udel.edu](mailto:mccoy@udel.edu)  
Phone: 302-831-2711

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**Esther Biswas** <ebiswas@udel.edu>  
To: Kathleen McCoy <mccoy@udel.edu>

Tue, Nov 8, 2016 at 1:17 PM

Thank you!

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Esther Biswas &lt;ebiswas@udel.edu&gt;

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## Email of support for graduate electives

3 messages

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**Esther Biswas** <ebiswas@udel.edu>  
To: "Peterson, P Michael" <pmpeter@udel.edu>

Tue, Nov 8, 2016 at 8:31 AM

Good morning Mike,

The Department of Medical Laboratory Sciences is proposing a new MS program in Medical Sciences (MMS) designed for practicing professionals (Medical Laboratory Scientists, Cytotechnologists, Cytogeneticists, etc.) who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology.

The curriculum asks that students complete six elective credits in areas that are of interest to their professional growth. I have formulated a list of potential electives based on our current list of possible electives for students in our existing Ph.D. program in Medical Sciences (see attached). I am writing to inquire whether you would have any objection to students in the MMS program selecting any of the following courses offered by your department as their electives:

NTDT610 Overweight/Obesity Prevention and Management  
NTDT611 Advanced Nutrition  
NTDT630 Trace Minerals & Vitamins  
NTDT640 Nutrition and Aging  
NTDT655 Issues in International Nutrition

If you agree, I would appreciate for the purposes of review by the Faculty Senate, an email indicating that you have no objection for MMS students choosing the above courses as electives.

Thank you for your support.

Best regards,

Esther

--

**Esther E. Biswas-Fiss, MS, Ph.D., MB(ASCP)CM**

Professor and Chair  
Department of Medical Laboratory Sciences  
University of Delaware  
305K Willard Hall Education Building  
16 W. Main Street  
Newark, DE 19716  
[ebiswas@udel.edu](mailto:ebiswas@udel.edu)

302-831-2912  
(856) 625-8300 cellular

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**P Peterson** <pmpeter@udel.edu>  
To: Esther Biswas <ebiswas@udel.edu>

Tue, Nov 15, 2016 at 7:10 AM

Dr. Biswas,

This email serves to confirm our approval to provide the following courses as electives for students in the Medical Sciences PhD program, provided students have the appropriate prerequisites as listed below:

NTDT610 Overweight/Obesity Prevention and Management Pre-req = any 3 credit undergraduate nutrition course  
NTDT611 Advanced Macronutrient Metabolism Pre-req = an undergraduate or higher macronutrient course (equivalent to NTDT400 or 401)  
NTDT630 Trace Minerals & Vitamins Pre-req = an undergraduate or higher macronutrient or micronutrient course (equivalent to NTDT400 or 401)  
NTDT640 Nutrition and Aging Pre-req = an undergraduate macronutrient or micronutrient course (equivalent to NTDT400 or 401)  
NTDT655 Issues in International Nutrition Pre-req = must be a graduate student

We look forward to assisting you with your graduate program.

Sincerely,

Mike Peterson

Michael Peterson Ed.D.  
Professor and Chair  
Department of Behavioral Health and Nutrition  
University of Delaware  
[pmpeter@udel.edu](mailto:pmpeter@udel.edu)  
302-831-1014

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**Esther Biswas** <ebiswas@udel.edu>  
To: P Peterson <pmpeter@udel.edu>

Tue, Nov 15, 2016 at 8:25 AM

Excellent - thank you for your support,

Best,

Esther

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Esther Biswas &lt;ebiswas@udel.edu&gt;

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## Letter of support for graduate electives

2 messages

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**Esther Biswas** <ebiswas@udel.edu>  
To: "Farquhar, William" <wbf@udel.edu>

Tue, Nov 8, 2016 at 8:21 AM

Good morning Bill,

The Department of Medical Laboratory Sciences is proposing a new MS program in Medical Sciences (MMS) designed for practicing professionals (Medical Laboratory Scientists, Cytotechnologists, Cytogeneticists, etc.) who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology.

The curriculum asks that students complete six elective credits in areas that are of interest to their professional growth. I have formulated a list of potential electives based on our current list of possible electives for students in our existing Ph.D. program in Medical Sciences (see attached). I am writing to inquire whether you would have any objection to students in the MMS program selecting any of the following courses offered by your department as their electives:

KAAP616 Advanced Mammalian Physiology  
KAAP655 Advanced Physiology of Exercise  
KAAP680 Exercise, Nutrition and Bone Health  
KAAP802 Human Cardiovascular Control  
KAAP840 Advanced Human Anatomy

If you agree, I would appreciate for the purposes of review by the Faculty Senate, an email indicating that you have no objection for MMS students choosing the above courses as electives.

Thank you for your support.

Best regards,

Esther

--

**Esther E. Biswas-Fiss, MS, Ph.D., MB(ASCP)CM**

Professor and Chair  
Department of Medical Laboratory Sciences  
University of Delaware  
305K Willard Hall Education Building  
16 W. Main Street  
Newark, DE 19716  
[ebiswas@udel.edu](mailto:ebiswas@udel.edu)



Esther Biswas &lt;ebiswas@udel.edu&gt;

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**URGENT - Email of support for graduate electives**

8 messages

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**Esther Biswas** <ebiswas@udel.edu>  
To: mccoym@udel.edu

Tue, Nov 8, 2016 at 9:13 AM

Good morning Dr. McCoy,

The Department of Medical Laboratory Sciences is proposing a new MS program in Medical Sciences (MMS) designed for practicing professionals (Medical Laboratory Scientists, Cytotechnologists, Cytogeneticists, etc.) who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology.

The curriculum asks that students complete six elective credits in areas that are of interest to their professional growth. I have formulated a list of potential electives based on our current list of possible electives for students in our existing Ph.D. program in Medical Sciences (see attached). I am writing to inquire whether you would have any objection to students in the MMS program selecting the following course offered by your department as an elective:

BINF644 Bioinformatics

If you agree, I would appreciate for the purposes of review by the Faculty Senate, an email indicating that you have no objection for MMS students choosing the above course as an elective. I apologize for the lateness of this request, I recently joined UD and had not realized that we need letters of support for elective courses proposed in new graduate programs.

Thank you for your support.

Best regards,

--

**Esther E. Biswas-Fiss, MS, Ph.D., MB(ASCP)CM**

Professor and Chair  
Department of Medical Laboratory Sciences  
University of Delaware  
305K Willard Hall Education Building  
16 W. Main Street  
Newark, DE 19716  
[ebiswas@udel.edu](mailto:ebiswas@udel.edu)  
302-831-2912  
(856) 625-8300 cellular

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**Cathy H Wu** <wuc@udel.edu>

Tue, Nov 8, 2016 at 10:40 AM

To: Kathleen McCoy <mccoy@udel.edu>

Cc: Esther Biswas <ebiswas@udel.edu>

Hi Kathy,

Yes, I approve "BINF644 Bioinformatics" to be listed as an elective for the MMS.

Indeed, I would highly recommend they also list "BINF694 System Biology I" as an elective. This course has also been taken by their PhD students and offers critical data analytics skills needed for analyzing the next-generation sequencing (NGS) data increasingly being used for medical diagnostics.

Best, Cathy

On 11/8/2016 9:19 AM, Kathleen McCoy wrote:

Hi Cathy - I just wanted to check that this was ok with you.

Thanks  
Kathy

---

Kathleen. F. McCoy  
Professor and Chair  
Computer and Information Sciences  
101J Smith Hall  
University of Delaware  
Newark, DE 19716  
[mccoy@udel.edu](mailto:mccoy@udel.edu)  
Phone: 302-831-2711

Begin forwarded message:

**From:** Esther Biswas <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
**Date:** November 8, 2016 at 9:13:47 AM EST  
**To:** [mccoy@udel.edu](mailto:mccoy@udel.edu)  
**Subject:** URGENT - Email of support for graduate electives

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Cathy H. Wu, Ph.D.

Edward G. Jefferson Chair of Bioinformatics & Computational Biology  
Professor, Departments of Computer & Information Sciences and Biological Sciences  
Director, Center for Bioinformatics & Computational Biology (CBCB)  
Director, Master's Programs in Bioinformatics & Computational Biology  
Director, PhD Program in Bioinformatics & Systems Biology  
Director, Protein Information Resource (PIR)  
Program Coordinator, Delaware INBRE  
University of Delaware  
Newark, DE 19711-5449

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**Kathleen McCoy** <[mccoy@udel.edu](mailto:mccoy@udel.edu)>  
To: Esther Biswas <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>

Tue, Nov 8, 2016 at 10:58 AM

Yes - CIS is happy to approve this course as an elective course in the MS Program in Medical Sciences.

Indeed, you may consider also listing "BINF694 System Biology I" as an elective. This course offers critical data analytics skills needed for analyzing the next-generation sequencing (NGS) data increasingly being used for medical diagnostics.

Best wishes,  
Kathy

---

Kathleen F. McCoy  
Professor and Chair  
Computer and Information Sciences  
101J Smith Hall  
University of Delaware  
Newark, DE 19716  
[mccoy@udel.edu](mailto:mccoy@udel.edu)  
Phone: 302-831-2711

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: Kathleen McCoy <[mccoy@udel.edu](mailto:mccoy@udel.edu)>

Tue, Nov 8, 2016 at 12:20 PM

Excellent - thank you for your rapid response. I appreciate the Systems Biology suggestion, and will make students aware of it.

Have a wonderful day,

Esther

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: Cathy H Wu <[wuc@udel.edu](mailto:wuc@udel.edu)>

Tue, Nov 8, 2016 at 12:21 PM

Excellent - thank you for your rapid response. I appreciate the Systems Biology suggestion and will make students aware of it.

Have a wonderful day,

Esther

[Quoted text hidden]

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: Kathleen McCoy <[mccoy@udel.edu](mailto:mccoy@udel.edu)>

Tue, Nov 8, 2016 at 1:11 PM

Dear Dr. McCoy,

Thank you for your rapid response regarding BINF 644 and suggestions of additional courses the students may be interested in. In my earlier email, I neglected to request permission to add *CISC 636 Bioinformatics* to the list of potential electives our MS in Medical Sciences students could register for.

Please advise.

Best regards,

Esther

[Quoted text hidden]

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**Kathleen McCoy** <mccoy@udel.edu>  
To: Esther Biswas <ebiswas@udel.edu>

Tue, Nov 8, 2016 at 1:13 PM

Yes - CIS also supports CISC636 on the list of electives.

Kathy

---

Kathleen F. McCoy  
Professor and Chair  
Computer and Information Sciences  
101J Smith Hall  
University of Delaware  
Newark, DE 19716  
[mccoy@udel.edu](mailto:mccoy@udel.edu)  
Phone: 302-831-2711

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**Esther Biswas** <ebiswas@udel.edu>  
To: Kathleen McCoy <mccoy@udel.edu>

Tue, Nov 8, 2016 at 1:17 PM

Thank you!

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[302-831-2912](tel:302-831-2912)  
[\(856\) 625-8300](tel:(856)625-8300) cellular

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**William Farquhar** <[wbf@udel.edu](mailto:wbf@udel.edu)>  
To: Esther Biswas <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>

Wed, Nov 16, 2016 at 11:39 AM

Hi Esther,

We no longer offer KAAP 802. Also, KAAP 840 hasn't been taught in a while. The others will be fine. I'll send a separate email stating the we agree to have these courses serve as electives in your program.

Thanks,

Bill

[Quoted text hidden]

--

William B. Farquhar, PhD, FACSM  
Professor & Chair  
Department of Kinesiology and Applied Physiology  
College of Health Sciences  
University of Delaware  
Newark, DE 19716

[302-831-6178](tel:302-831-6178) (phone)  
[302-831-3693](tel:302-831-3693) (FAX)  
[wbf@udel.edu](mailto:wbf@udel.edu)





Esther Biswas &lt;ebiswas@udel.edu&gt;

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## Email of support for graduate electives

5 messages

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**Esther Biswas** <ebiswas@udel.edu>  
To: Barbara Habermann <habermab@udel.edu>

Tue, Nov 8, 2016 at 8:37 AM

Good morning Barbara,

The Department of Medical Laboratory Sciences is proposing a new MS program in Medical Sciences (MMS) designed for practicing professionals (Medical Laboratory Scientists, Cytotechnologists, Cytogeneticists, etc.) who want to advance their knowledge and skills in the clinical laboratory sciences and develop new proficiencies needed to meet the challenges of a changing profession and fast-paced development in technology.

The curriculum asks that students complete six elective credits in areas that are of interest to their professional growth. I have formulated a list of potential electives based on our current list of possible electives for students in our existing Ph.D. program in Medical Sciences (see attached). I am writing to inquire whether you would have any objection to students in the MMS program selecting any of the following courses offered by your department as their electives:

NURS621 Advanced Pathophysiology  
NURS812 Responsible Conduct of Research

If you agree, I would appreciate for the purposes of review by the Faculty Senate, an email indicating that you have no objection for MMS students choosing the above courses as electives.

Thank you for your support.

Best regards,

Esther

--

**Esther E. Biswas-Fiss, MS, Ph.D., MB(ASCP)CM**

Professor and Chair  
Department of Medical Laboratory Sciences  
University of Delaware  
305K Willard Hall Education Building  
16 W. Main Street  
Newark, DE 19716  
[ebiswas@udel.edu](mailto:ebiswas@udel.edu)

302-831-2912  
(856) 625-8300 cellular

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**Barbara Habermann** <habermab@udel.edu>  
To: Esther Biswas <ebiswas@udel.edu>  
Cc: Emily Jean Hauenstein <ehauenst@udel.edu>

Tue, Nov 8, 2016 at 1:23 PM

Esther,  
I am copying Emily on this. For the purpose of faculty senate, the email should probably come from her.

Sent from my iPad  
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**Hauenstein, Emily Jean** <ehauenst@udel.edu>  
To: "Biswas, Esther" <ebiswas@udel.edu>  
Cc: "Habermann, Barbara" <habermab@udel.edu>

Tue, Nov 8, 2016 at 1:32 PM

Hi Esther,

I am in support of listing these electives. Two comments however. We have had some issues with 621 that we will need to correct. I am interested in exploring moving this to an interdisciplinary course taught by an expert in pathophysiology. The other comment is that you should look at Population Health I and II which provide an overview of the social determinants of health and health outcomes in the first course, and health services inequities and solutions in the second.

Let me know what you need to move your work forward.

*Emily Hauenstein, PhD, LCP, MSN, FAAN*

Professor and Katherine L. Esterly Unidel Chair of Health Sciences

Senior Associate Dean for Nursing and Healthcare Innovation

University of Delaware College of Health Sciences

School of Nursing

25 North College Street

Newark DE 19716

302-831-7578

[ehauenst@udel.edu](mailto:ehauenst@udel.edu)



Emily

---

**From:** Barbara Habermann [mailto:[habermab@udel.edu](mailto:habermab@udel.edu)]  
**Sent:** Tuesday, November 8, 2016 1:23 PM  
**To:** Biswas, Esther  
**Cc:** Hauenstein, Emily Jean  
**Subject:** Re: Email of support for graduate electives

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**Esther Biswas** <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>  
To: "Hauenstein, Emily Jean" <[ehauenst@udel.edu](mailto:ehauenst@udel.edu)>  
Cc: "Habermann, Barbara" <[habermab@udel.edu](mailto:habermab@udel.edu)>

Tue, Nov 8, 2016 at 2:01 PM

Thank you both for your rapid responses - your support is appreciated. We can certainly add courses on population health to the list. My desire is to make the offerings broad so as to meet the interests of the students.

Is the pathophysiology course still being offered - or is it under revision? I would agree that interdisciplinary courses can offer a richness of content experts and are a good fit for grad students.

Best regards,

Esther

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**Hauenstein, Emily Jean** <[ehauenst@udel.edu](mailto:ehauenst@udel.edu)>  
To: "Biswas, Esther" <[ebiswas@udel.edu](mailto:ebiswas@udel.edu)>

Tue, Nov 8, 2016 at 2:05 PM

It will be offered because it is a core course in the DNP curriculum. The objectives are not likely to change either. It is mostly a methods issue.

Emily

**From:** Esther Biswas [mailto:[ebiswas@udel.edu](mailto:ebiswas@udel.edu)]  
**Sent:** Tuesday, November 8, 2016 2:01 PM  
**To:** Hauenstein, Emily Jean  
**Cc:** Habermann, Barbara

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## Appendix 2

### Suggested Course Sequence

**Department of Medical Laboratory Sciences  
MS in Medical Sciences**

**Sample Schedule of Course Completion\*  
Four Semester Option**

**Fall 1**

MEDT 603 Research Design	3
MEDT 604 Methods in Bioscience Education	3
MEDT 803 Seminar	1
MEDT 611 Advanced Practica I	<u>2</u>
	9

**Spring 1**

MEDT 603 Regulatory & Fiscal Issues in Lab Mgmt	3
MEDT 803 Seminar	1
MEDT 631 Lab Education & Admin Concentration	2
Elective	<u>3</u>
	9

**Fall 2**

MEDT 868 Research	3
MEDT 803 Seminar	1
MEDT 612 Advanced Practica II	2
Concentration Elective	<u>3</u>
	9

**Spring 2**

MEDT 632 Lab Admin & Management	2
MEDT 613 Advanced Practica III	2
MEDT 868 Research	<u>3</u>
	7

Sequences can vary; for example, the program can be completed in an extended part-time option over the course of 5-6 semesters, where students complete an average of 4-6 credits per semester. An accelerated 3 semester option is also possible.