Course Change Request

New Course Proposal

Date Submitted: 09/29/21 10:45 am

Viewing: BINF 480 : Gateway to a Medical Career

Last edit: 11/01/21 2:34 pm

Changes proposed by: jbazaz

In Workflow

1. **BINF Undergraduate Representative**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost-Undergraduate
5. Registrar-Courses
6. Banner

Approval Path

1. 10/20/21 7:25 pm Iosif Vaisman (ivaisman): Approved for BINF Undergraduate Representative

Are you completing this form on someone else's behalf?

Yes

Requestor:

Name	Extension	Email
Alessandra Luchini	8945	aluchini@gmu.edu

Effective Term: Spring 2022

Subject Code: BINF - Bioinformatics

Course Number: 480

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Gateway to a Medical Career

Banner Title: Gateway to a Medical Career

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May be only taken once for credit, limited to 3 attempts (N3)

Max Allowable Credits: 9

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

An undergraduate BIOL or CHEM course, or permission of instructor.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(	Course/Test Code	Min Grade/Score	Academic Level	)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

The mission of this class is to prepare students for many types of medical careers. Students will revisit notions acquired in previous chemistry and biology classes and contextualize them in relation to human diseases. Systemic approach to physiology and pathology of human diseases will be undertaken, with emphasis on cancer biology.

Justification:

This undergraduate level class is created to provide students interested in a career in the biomedical industry with skills and information that will guide them to make informed decisions. Instructors have received informal positive feedback from Mason undergraduate students suggesting great interest in the topic.

Does this course cover material which crosses into another department? No

Learning Outcomes:

Upon completing this course, students will be able to:

1. Communicate effectively in both oral and written forms, applying appropriate rhetorical standards (e.g., audience adaptation, language, argument, organization, evidence, etc.)
2. Using perspectives from two or more disciplines, connect issues in a given field to wider intellectual, community or societal concerns
3. Apply critical thinking skills to:

a. Evaluate the quality, credibility and limitations of an argument or a solution using appropriate evidence or resources, OR,

b. Judge the quality or value of an idea, work, or principle based on appropriate analytics and standards

Additional learning outcomes include:

Proficiency in describing structures, functions and disease of an organ system including heart, lungs, or brain.

Proficiency in describing cancer biology, diagnostic and imaging methodologies, and medicine biodistribution.

Proficiency in describing ethical principles in human subject research.

Attach Syllabus

BINF 480.pdf

Additional Attachments

Staffing:

Alessandra Luchini

Lance Liotta

Relationship to Existing Programs:

This class targets undergraduate students interested in a medical career who are in the Biology undergraduate program. This class can be open also to any undergraduate student, including those in bioengineering, health and human services, and psychology.

Relationship to Existing Courses:

None, this class is unique. It covers topics related to a career in medicine, not limited to medical schools, but relevant to all medical careers including genetic advisors, biotechnology, bioinformatics, biomedical device experts. This class will host professionals in medical careers to serve as role model for students.

Additional Comments:

Reviewer Comments

Key: 17330

BINF 480 Gateway to a medical career.

From scientific concepts to ethics and professional development.

Instructors

Alessandra Luchini

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Science and Technology Campus

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Lance Liotta

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Principles of the course.

The healthcare sector in the United States encompasses businesses that provide medical services, manufacture drugs or medical equipment, provide medical insurance, or facilitate healthcare provision to patients. The healthcare sector occupies a large share of the US economy, whereby up to 18% of the US GDP is spent annually in healthcare. The mission of this class is to prepare students for many types of medical careers. Students will revisit notions acquired in previous chemistry and biology classes and contextualize them in relation to human diseases. System approach to physiology and pathology of

human diseases will be undertaken, with emphasis on cancer biology. This class will host professionals in medical careers to serve as role model for students.

The following topics will be covered:

Organ system medicine, basic physiology of heart, lungs and brain.

Organ system diseases and treatments, heart, lungs and brain.

Introduction to cancer biology

Diagnostics and Imaging methods

Biodistribution of medicines in the body

Design of clinical trials and ethics in biomedical research

Medical ethics

MCAT and the medical school admission structure

Patient interviews.

Professional series: Meet the oncologist, Meet the dentists, Meet the genetic counselor, meet the epidemiologist.

Course Grading

Grades will be based on 1) mid-term take home exam, 2) final project (Power Point presentation, project description in a Word file, critique of a colleague's presentation in a word file) and 3) class participation (35%, 35%, 30%, respectively).

Mid-term take home exam: Students will be given three essay questions. Students will have one week to answer to the questions. This assignment will be open book and carried out individually.

Final project.

Presentation: each student individually will propose a solution to an unanswered medical challenge using the principles of the class. Students will prepare a power point presentation and deliver it to the class during the final three classes of the semester.

The presentation should include:

1. Description of the problem.
2. Explanation of why past solutions have failed.
3. Description of different radical ways of solving the problem. Choice of one solution and explanation of why it is the best idea.
4. Description of how to implement your idea.
5. Description of commercial potential and societal potential.

A ***summary*** of the project will be written in word and submitted to the instructors. The formatting is as follows: Arial 11, narrow margins (0.5" top, bottom, left and right margin), 2 pages, single space.

Critique: Students will be asked to evaluate the final presentations of their colleagues. Students will be assigned one presentation to evaluate, and they will compose a written evaluation incorporating the following criteria: significance, innovation, and approach. Criterion specific questions are as follows. Significance: Does the presentation address an important problem or a critical barrier to progress in the field? How will the presented idea improve scientific knowledge, technical capability, clinical practice, or societal well-being? Innovation: Does the presentation seek to shift current paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation or interventions? Are concepts, approaches or methodologies, instrumentation or interventions novel to one field or novel in a broad sense? Is the proposed idea incremental with respect to current concepts, approaches or methodologies, instrumentation or interventions? Approach: Did the presentation include sufficient details to judge the idea and the proposed implementation? Are potential problems, alternative strategies and benchmark for success presented? Formatting: Arial 11, narrow margins (0.5" top, bottom, left and right margin), 1 page, single space

Course Learning Outcomes:

This is a synthesis course. Upon completing this course, students will be able to

1. Communicate effectively in both oral and written forms, applying appropriate rhetorical standards (e.g., audience adaptation, language, argument, organization, evidence, etc.)
2. Using perspectives from two or more disciplines, connect issues in a given field to wider intellectual, community or societal concerns
3. Apply critical thinking skills to:
    1. Evaluate the quality, credibility and limitations of an argument or a solution using appropriate evidence or resources, OR,
    2. Judge the quality or value of an idea, work, or principle based on appropriate analytics and standards

Additional learning outcomes include:

Proficiency in describing structures, functions and disease of an organ system including heart, lungs, or brain.

Proficiency in describing cancer biology, diagnostic and imaging methodologies, and medicine biodistribution.

Proficiency in describing ethical principles in human subject research.

Definition of Grades for Graduate Courses

Grade	Quality Points	Graduate Courses
A+	4.00	Passing
A	4.00	Passing
A-	3.67	Passing
B+	3.33	Passing
B	3.00	Passing
B-	2.67	Passing
C+	2.33	Passing
C	2.00	Passing

C-	1.67	Passing
D	1.00	Passing
F	0.00	Failing

Information about additional grade notations including "IN" Incomplete and "IP" In Progress may be found in the Academic Policies section of the catalog under Grading System.

Weekly schedule

Date	**Topic**
Week 1	The heart: basic physiology, diseases and treatment
Week 2	The lungs: basic physiology, diseases and treatment
Week 3	The brain: basic physiology, diseases and treatment
Week 4	Introduction to cancer biology
Week 5	Cancer biology
Week 6	Diagnostics and Imaging methods
Week 7	Biodistribution of medicines in the body
Week 8	Design of clinical trials and ethics in biomedical research
Week 9	Medical ethics
Week 10	MCAT and the medical school admission structure / Patient interviews
Week 11	Professional series: meet experts in oncology, dentistry, genetic counseling, epidemiology
Week 12	Students' presentations
Week 13	Students' presentations
Week 14	Students' presentations
Week 15	Final Exam due

Plagiarism:

Plagiarism is the presentation of someone else's ideas or work as one's own. Students must give credit for any information that is not either the result of original research or common knowledge. If a student borrows ideas or information from another author, he/she must acknowledge the author in the body of the text and on the reference page. Students found plagiarizing are subject to the penalties outlined in the Policies and Procedures section of the University Catalog, which include a hearing by the Honor Code Committee and may include a failing grade for the work in question or for the entire course. The following website provides

helpful information concerning plagiarism for both students and faculty: http://oai.gmu.edu/the-mason-honor-code-2/plagiarism/

Honor Code:

- George Mason University has an Honor Code, which requires all members of this community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are all prohibited
- All violations of the Honor Code will be reported to the Honor Committee.
- See http://oai.gmu.edu/the-mason-honor-code-2/ for more detailed information.

Enrollment:

- Students are responsible for verifying their enrollment in this class.
- Schedule adjustments should be made by the deadline published on the Registrar's website.
- Note the add/drop dates in the Academic Calendar published on the Registrar's website.
- After the last day to drop a class, withdrawing from this class requires the approval of the dean and is only allowed for nonacademic reasons.
- Undergraduate students may choose to exercise a selective withdrawal.
- See http://registrar.gmu.edu for selective withdrawal procedures.

Ethics:

Ethical behavior in the classroom is required of every student. The course will identify ethical policies and practices relevant to course topics.

Technology:

Students are expected to be competent in using current technology appropriate for this discipline. Such technology may include presentation software. Students are required to become familiar with Mason's Responsible Use of Computing Policy #1301 http://copyright.gmu.edu/?page_id=301

Diversity:

Learning to work with and value diversity is essential in every class. Students are expected to exhibit an appreciation for multinational and gender diversity in the classroom.

Civility:

As a diverse community of learners, students must strive to work together in a setting of civility, tolerance, and respect for each other and for the instructor. Rules of classroom behavior (which apply to online as well as onsite courses) include but are not limited to the following:

- Conflicting opinions among members of a class are to be respected and responded to in a professional manner.
- Side conversations or other distracting behaviors including cell phone use or non-class online access are not to be engaged in during lectures, class discussions or presentations
- There are to be no offensive comments, language or gestures

Students not complying will be asked to cease immediately or leave the class session.

Students with Disabilities:

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703.993.2474. All academic accommodations must be arranged through that office.