Course Change Request

New Course Proposal

Date Submitted: 11/03/22 12:48 pm

Viewing: BIMR 510 : Creativity and Innovation

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Changes proposed by: dstgerma

In Workflow

1. SC Curriculum Committee
2. SC Associate Dean
3. Assoc Provost-Graduate
4. Registrar-Courses
5. Banner

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

Yes

Requestor:

Name	Extension	Email
Donna Fox	3-8797	dfox1@gmu.edu

Effective Term: Spring 2023

Subject Code: BIMR - Biomedical Research

Course Number: 510

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Creativity and Innovation

Banner Title: Creativity and Innovation

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May only be taken once for credit, limited to 2 attempts (N2)

Max Allowable Credits: 6

Default Grade Mode: Graduate Regular

Recommended Prerequisite(s):

Undergraduate upper-level coursework in Biology, Biochemistry, Chemistry, and Physics, or the equivalents.

Recommended Corequisite(s):

None

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

None

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:

Creativity and innovative thinking is the most important requirement for success in any field. Creative thinking drives all progress in the arts, the sciences, and the commercial sector. Under this philosophy, students will be immersed in a culture of creativity surrounded by mentors and advisors who explain and demonstrate the creative process. Students will be shown that every team member in a modern career – ranging from summer scientists to tenured professors – can be the originator (and inventor) of a seminal idea that opens a whole new field.

Justification:

o What: Creating a new course.

o Why: The course has been offered as selected topics for several years and has been very successful. We have been asked by COS Academic Affairs Dean to create a unique course with its own number. The new course would be open to graduate students, and to undergraduate students with permission.

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

Learning Outcomes:

Demonstrate applications of acquired knowledge of the mental process of creativity. Understand the difference between creativity and innovation.

Become acquainted with concepts in innovation and patent submission structure.

Understand the process of going from an idea to prototype to finish product.

Recognize pitfalls and roadblocks to successful implementation of a creative idea.

Formulate an original research topic

Demonstrate proficiency and excellence in the core concepts

Attach Syllabus

Syllabus Creativity and Innovation SP23.pdf

Additional Attachments

Additional Comments:

Reviewer Comments

Key: 17925

School of Systems Biology

Creativity and Innovation - BIMR 510

Spring 2023

Instructors

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Textbook: There is no textbook required for this class; course materials will be made available on Blackboard.

Credit hours: 3.000 Credits
Meeting days and times: TBD
Building and room: TBD

Course description

Creativity and innovative thinking is the most important requirement for success in any field. Creative thinking drives all progress in the arts, the sciences, and the commercial sector. Under this philosophy, students will be immersed in a culture of creativity surrounded by mentors and advisors who explain and demonstrate the creative process. Students will be shown that every team member in a modern career – ranging from summer interns to executives – can be the originator (and inventor) of a seminal idea that opens a whole new field.

To succeed in the current highly competitive funding climate, a scientist must submit a grant proposal that is highly daring and risky, or they will fail to gain the attention of the study section. Moreover, if the idea isn't totally new then it cannot be patented, and it will not have a significant impact in the commercial sector. Consequently, maximizing creativity is of primary importance to maintain a competitive edge in biomedical science. We strive to ensure that our students fundamentally understand that they gain future job security in science by taking a risk in the lab. Instead of following the current scientific vogue, we want our trainees to launch the next viral idea. We aspire to graduate scientists that create new technology, propose radical

hypotheses, or select radical experimental systems, not just because it is cool, and may increase the probability of winning a grant application, but because it can be used to ask, and answer, questions in biology and medicine that have never been possible before.

In the beginning of this course, students will explore the origin and value of creativity and will be presented with examples of successful disruptive ideas and ideas that failed. In week seven, the students will receive a complete tutorial on patents and intellectual property for scientists. Throughout the course, students will exercise their creative abilities to solve real world timely scientific problems posed in class.

Course Grading

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

Mid-term take home exam: Open book essay on topics covered in class related to patents and inventions. Essay questions will be different at the graduate and undergraduate level.

Final presentation: students will propose a solution to a given challenge using the principles of the class. Students will prepare a power point presentation and deliver it to the class during the final four 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.

Students will be required to prepare at least 20 slides.

Course Learning Outcomes:

- Demonstrate applications of acquired knowledge of the mental process of creativity. Understand the difference between creativity and innovation.
- Become acquainted with concepts in innovation and patent submission structure.
- Understand the process of going from an idea to prototype to finish product.
- Recognize pitfalls and roadblocks to successful implementation of a creative idea.
- Formulate an original research topic
- Demonstrate proficiency and excellence in the core concepts

Definition of Grades for Graduate Courses

Grade	Quality Points	Graduate Courses
A+	4.00	Satisfactory/Passing
A	4.00	Satisfactory/Passing
A-	3.67	Satisfactory/Passing
B+	3.33	Satisfactory/Passing
B	3.00	Satisfactory/Passing

B-	2.67	Satisfactory*/Passing
C	2.00	Unsatisfactory/Passing
F	0.00	Unsatisfactory/Failing

* Although a B- is a satisfactory grade for a course, students must maintain a 3.00 average in their degree program and present a 3.00 GPA for the courses listed on the graduation application.

Information about additional grade notations that apply to graduate students including "IN" Incomplete and "IP" In Progress as well as grading for undergraduate students may be found in the Academic Policies section of the catalog under Grading System. Graduate students are not required to take midterm exams.

Weekly schedule

Date	Topic
Week 1	Creativity / Will artificial intelligence take over the world?
Week 2	The Future of Medicine: Critical Medical Challenges Facing Doctors of the Future
Week 3	Cracking the carbohydrate structure code / Ethics in Creativity and Innovation
Week 4	The Mind of Cancer (Is cancer good for you?) / Where is the new CRISPR/Cas9 technology going to come from? : Plant immune response
Week 5	Why do we dream? / Intellectual Property and Patents
Week 6	Cancer Immune evasion
Week 7	Mid-term is due
Week 8	Debate
Week 9	Dr. Richard Hoefer
Week 10	The mind of a honeybee / Do insects have consciousness?
Week 11	Practicing Creativity: students' presentations
Week 12	Practicing Creativity: students' presentations
Week 13	Practicing Creativity: students' presentations
Week 14	Practicing Creativity: students' presentations
Week 15	Final is due

The course will be divided into three parts.

Part 1 Introduction to Creativity

What is Creativity? What is the difference between creativity and innovation? How does the creative process work? Does art versus science require a separate type of creativity? How can creativity be encouraged? How is creativity suppressed or discouraged? Examples of disruptive technologies. Examples of creativity based on addressing a need. Brainstorming. Creativity by trying to predict the future. How to know when to give up on one approach and move to another. Why is creativity and risk taking the most important skill for success in science? Marketing your idea. Creativity applied to medical diagnosis and treatment. Examples of the hottest trends is science today, and the impact of "fads" in science.

Part 2 Inventions and Patents: A practical tutorial for scientists

Introduction: origin and value of patents. Common misconceptions about patents. Types of Patents. Meaning of Novel, Non Obvious and Useful in Patent Terms. Utility versus composition of matter. Design Patents. Plant Patents. What is not patentable based on recent Supreme Court Decisions? Co-Inventors: Who is an inventor? Provisional Patent Application. Preparing a patent application. Design and language of Claims. Examiner office actions. Patent fees and issuance. Types of Licenses. Non-Disclosure Agreements. Notebook records. Prior Art Searches. What constitutes a prior art disclosure? Examples of successful and flawed patents.

Part 3 Practicing Creativity

Students will participate in group brainstorming sessions that is coached by the Professors who pose a specific challenge. The students will compare different approaches to generating unexpected creative lead ideas. Every week, students will be posed different practical health related scientific challenges that are within their realm of expertise. Each challenge is a problem that could lead to a patentable invention, a grant application, or a high impact publication if a creative approach can be found. The students will be divided into groups of three and each group will work on their own to develop an approach to the challenge. Each group will then present their solutions to the whole class orally, or by PowerPoint or even prototype mock up. Each group will choose one challenge to be developed further as their final presentation.

Safe Return to Campus Statement

The well-being and safety of our university community remain a priority at all levels.

We will continue to encourage weekly COVID testing and updated vaccinations, available free on campus for students, faculty, and staff. In order to have visibility and situational awareness, positive COVID cases are required to be reported via the Mason COVID Health Check. Masks are still required in healthcare and medical facilities but not mandated elsewhere. Updated details can be found here. Please refer to the following website for updated details (https://www.gmu.edu/safe-return-campus).

Participation/visibility policy

For online classes, students should turn on their video to be considered present. However, non-video participation is allowed for students whose workspaces are not private or whose technology or family situations make live video streaming difficult. Students will be counted "present" without sharing a video of themselves if:

- Students will add comments to a chat or poll, perhaps at the beginning and ending of a class, or
- Students who submit brief class notes without sharing video (e.g., "Three major points and one question"), or
- Students who complete a "minute paper" to submit at the end of class (e.g., "The clearest point and the muddiest point for me from today's class were ___")

Basic Course Technology Requirements (Two options)

- *Activities and assignments in this course will regularly use the Blackboard learning system, available at https://mymason.gmu.edu. Students are required to have regular, reliable access to a computer with an updated operating system (recommended: Windows 10 or Mac OSX 10.13 or higher) and a stable broadband Internet connection (cable modem, DSL, satellite broadband, etc., with a consistent 1.5 Mbps [megabits per second] download speed or higher. You can check your speed settings using the speed test on this website.)*

- *Activities and assignments in this course will regularly use web-conferencing software (Blackboard Collaborate / Zoom). In addition to the requirements above, students are required to have a device with a functional camera and microphone. In an emergency, students can connect through a telephone call, but video connection is the expected norm.*

Course Materials and Student Privacy

All course materials posted to Blackboard or other course site are private to this class; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.

- *Video recordings -- whether made by instructors or students -- of class meetings that include audio, visual, or textual information from other students are private and must not be shared outside the class*
- *Live video conference meetings (e.g. Collaborate or Zoom) that include audio, textual, or visual information from other students must be viewed privately and not shared with others in your household or recorded and shared outside the class*

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. Diversity is one of George Mason

University's core values. The instructors of this course and the University are committed to this value. The following resources are available to students and faculty: the Center for Culture, Equity, and Empowerment (https://stearnscenter.gmu.edu/wp-content/uploads/Diversity-Syllabus-Language-CCEE.pdf), LBGTQ+, Mason Non-Discrimination Policy, and Mason Diversity Statement.

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 contact the Office of Disability Services at 703.993.2474 and see the instructors on the first day of class. All academic accommodations must be arranged through that office. *Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474*