

**BIOL691**  
**“CREATIVITY AND INNOVATION”**  
**FALL 2020 SEMESTER**  
**12:00 PM – 14:45 PM THURSDAY**  
**CREDIT HOURS: 3.000 CREDITS**  
**LOCATION: TO BE ANNOUNCED**

### **Course Description**

Creativity and innovative thinking are essential requirements for success in any field. Wherever we work, we are confronted with unforeseen challenges that require unique and novel solutions. Creative thinking is the foundation for progress in science, arts, and the commercial sector. Maximizing creativity is of primary importance to maintain a competitive edge in biomedical science. Everyone has the capacity for unique, innovative ideas. During this course, the creative process will be explained and demonstrated. Guided by the instructor, students will practice their creativity and hone their skills by developing, fine-tuning, and sharing innovative ideas.

Students will first explore the process and value of creativity and will be presented with successful and failed examples. Students will learn how creativity can be encouraged or discouraged, brainstorming, when to give up on one approach and move to another. In addition, tools and best practices will be taught on confidently presenting ideas and efficiently “speed-reading” scientific literature.

Students will practice developing groundbreaking ideas using real world challenges from the fields of science, medicine, and technology, with group brainstorming sessions coached by the instructor. Small groups will present their own approach to the challenge each week.

Students will receive a practical tutorial on patents and intellectual property for scientists. They will be introduced to different kinds of patents, common misconceptions about patents, patent terms, what is and is not patentable based on recent Supreme Court Decisions, patent fees, non-disclosure agreements, and prior art searches. They will also learn from examples of successful and flawed patents.

The goals of the course are to be able to:

1. come up with novel ideas, using helpful tools that enable the creative process,
2. confidently and convincingly convey these ideas,
3. have a basic understanding of patents and intellectual property.

### Instructor

Claudius Mueller

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703-993-9932

Institute for Advanced Biomedical Research 2045 (SciTech campus)

### Class Schedule (subject to change)

Date	Topic
Aug 27	Introduction / Creativity / Will artificial intelligence take over the world?
Sep 03	Why do we laugh?
Sep 10	Gene editing to improve humankind?
Sep 17	The hive mind of cancer.
Sep 24	Why do we dream?
Oct 01	Cracking the carbohydrate structure code.
Oct 08	Why do we need patents?
Oct 15	Plant communication and immunology.
Oct 22	Are microorganisms going to rule the world?
Oct 29	A future of cyborgs.
Nov 05	The intelligence of the extracellular matrix.
Nov 12	Student's presentation: Team Project
Nov 19	Student's presentation: Team Project
Nov 26	THANKSGIVING BREAK
Dec 03	Student's presentation: Team Project

### Grading

Grades will be based on:

1. a weekly group assignment that is scored by peers and instructor (20%),
2. a mid-term take home exam (30%),
3. a final project presented to the class (30%),
4. class participation (20%).

*Weekly group assignment:* Students will be split into groups. Each week a challenge is introduced based on a real world problem in science, medicine, or technology. Each group will develop a creative solution to the challenge and present this solution to the class.

Presentations will be scored by the other students (50% of score combined) and the instructor (50% of score) focusing on:

- Clear description of the problem.
- Innovation of the idea presented.
- Convincing presentation of the idea.

*Mid-term take home exam:* The exam will be carried out individually and focus on student's application of patent knowledge.

*Final project:* Each student group will select one of the previous weekly group assignments and prepare a 45-minute presentation (PowerPoint, or otherwise visual/creative). This will be presented to the class during the final three classes of the semester.

Presentations will be scored by the instructor focusing on:

- Clear description of the problem.
- Explanation of past solutions that have failed.
- Description of different radical solutions, choice of one solution, and explanation of why this was chosen.
- Innovation of the idea presented.
- Description of how to implement the idea.
- Description of the commercial and societal potential.
- Convincing presentation of the idea.

*Class participation:* Each student will be graded by how they participated in class discussions. In addition, students will lose points if the group they were assigned to raises valid complaints about their contribution to the group assignments.

#### *Definition of Grades*

100-93% A; 92-90% A-; 89-87% B+; 86-83% B; 82-80% B-; 77-79% C+; 73-76% C; 70-72% C-; 65-69% D; <65% F

If any assignment is not graded with a B or equivalent on the first try, the student is allowed to repeat the assignment to prove their competency. The highest recorded grade that can be earned from a repeated assignment is 80% (B).

## Academic Integrity

GMU is an Honor Code University; please see the University Catalog for a full description of the code and the honor committee process (<http://catalog.gmu.edu>). The principle of academic integrity is taken very seriously and violations are treated gravely. When in doubt (of any kind) please ask for guidance and clarification.

## 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/>

## 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.

## Diversity

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

### **Office of Disability Services**

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS (<http://ods.gmu.edu>).

### **GMU Email Accounts & Blackboard**

Students must use their Mason email accounts to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information. The use of Blackboard is required. Please use your GMU username and password to log in (<http://mymason.gmu.edu>).

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**Counseling and Psychological Services (CAPS): (703) 993-2380; <http://caps.gmu.edu>**

### **University Policies**

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.