Electronic Course Authorization System (ECAS)

BIOL 3051 - VIEW COURSE PROPOSAL

Back to Proposal List

Approvals Received:	**Department** on 3/5/21 by John Ward (jward@umn.edu) >	**College/Dean** on 4/15/21 by John Ward (jward@umn.edu) >	**Provost** on 4/15/21 by Jessica Kuecker Grotjohn (jkuecker@umn.edu)
Approvals Pending:	**LE** > Catalog		
Effective Status:	Active		
Effective Term:	1223 - Spring 2022		
Course:	BIOL 3051		
Institution:	UMNTC - Twin Cities/Rochester		
Campus:	UMNTC - Twin Cities		
Career:	UGRD		
College:	TCBS -		
Department:	10876 -		

General

Course Title Short:	Genome Editing and Engineering
Course Title Long:	Genome Editing and Engineering
Max-Min Credits for Course:	3.0 to 3.0 credit(s)
Catalog Description:	Allowing researchers to modify genetic information in nearly any organism?s genome, genome editing and engineering technologies have been widely used in all areas of biology. These technologies have evolved rapidly in recent years and not only hold the promise to revolutionize medical and agricultural fields, but also make profound impacts on our society. The purpose of the course is to give students a comprehensive overview of principles, development and applications of genetic engineering and genome editing technologies in both prokaryotes and eukaryotes. This course will introduce concepts and history of genome engineering in both prokaryotes and eukaryotes. We will discuss the mechanisms and applications of both techniques using examples in bacteria and plant genome and metabolic pathway engineering. Students will also have hands-on experience to design CRISPR and modify bacterial and plant genomes. In addition, this course will contribute to students? liberal education by discussing the consequences of these technologies for society and technological development, including the ethics of altering genomes, consequences on ecosystems, and the benefits, drawbacks, and limitations of these technologies.

	Recommended prerequisites: Introductory biology such as Biol 1951 and 2003, Biol 1009 or BMEN 2501
Print in Catalog?:	Yes
CCE Catalog Description:	false
Grading Basis:	OPT
Topics Course:	No
Honors Course:	No
Online Course:	No
Freshman Seminar:	No
Is any portion of this course taught outside of the United States?:	No
Community Engaged Learning (CEL):	**New:** None **Old:**
Instructor Contact Hours:	3.0 hours per week
Course Typically Offered:	Every Spring
Component 1:	LEC
Component 2:	<No text provided>
Auto Enroll Course:	No
Graded Component:	LEC
Academic Progress Units:	3.0 credit(s) (Not allowed to bypass limits.)
Financial Aid Progress Units:	3.0 credit(s) (Not allowed to bypass limits.)
Repetition of Course:	Repetition not allowed.
Course Prerequisites for Catalog:	<No Text Provided>
Course Equivalency:	<No text provided>
Cross-listings:	No cross-listings
Add Consent Requirement:	No required consent
Drop Consent Requirement:	No required consent
Enforced Prerequisites: (course-based or non-course-based):	No prerequisites
Editor Comments:	<No text provided>
Proposal Changes:	<No text provided>
History Information:	4/9/21: Course approved by CCC. JKG New course 3/21 (JW)
Faculty Sponsor Name:	Kyle Costa
Faculty Sponsor E-mail Address:	kcosta@umn.edu

Student Learning Outcomes

Student Learning Outcomes

* Students in this course:

- Can identify, define, and solve problems

How will you assess the students' learning related to this outcome? Give brief examples of how class work related to the outcome will be evaluated.

Students will learn to interpret results and use rational, scientifically grounded arguments to defend a contention.

Please explain briefly how this outcome will be addressed in the course. Give brief examples of class work related to the outcome.

Assessment of student learning will be done through three exams, problems, quizzes, and discussions.

- Have mastered a body of knowledge and a mode of inquiry

How will you assess the students' learning related to this outcome? Give brief examples of how class work related to the outcome will be evaluated.

Discussions of the importance of peer-reviewed vs. popular literature. Instruction in evaluating sources of information. Students will learn how to rationally design experiments to manipulate an organism?s genome and what experiments are considered ethical and appropriate. Students will discuss how to distill complex language from scientific studies into ?layman?s terms? so students can effectively communicate scientific data with the general public.

Please explain briefly how this outcome will be addressed in the course. Give brief examples of class work related to the outcome.

Assessment of student learning will be done through three exams, problems, quizzes, and discussions.

Liberal Education

Requirement this course fulfills:

TS Technology and Society

Other requirement this course fulfills:

<no text provided>

Criteria for Core Courses:

Describe how the course meets the specific bullet points for the proposed core requirement. Give concrete and detailed examples for the course syllabus, detailed outline, laboratory material, student projects, or other instructional materials or method.

Core courses must meet the following requirements:

- **They explicitly help students understand what liberal education is, how the content and the substance of this course enhance a liberal education, and what this means for them as students and as citizens.**
- **They employ teaching and learning strategies that engage students with doing the work of the field, not just reading about it.**
- **They include small group experiences (such as discussion sections or labs) and use writing as appropriate to the discipline to help students learn and reflect on their learning.**
- **They do not (except in rare and clearly justified cases) have prerequisites beyond the University's entrance requirements.**
- **They are offered on a regular schedule.**
- **They are taught by regular faculty or under exceptional circumstances by instructors on continuing appointments. Departments proposing instructors other than regular faculty must**

provide documentation of how such instructors will be trained and supervised to ensure consistency and continuity in courses.

Criteria for Theme Courses:

Describe how the course meets the specific bullet points for the proposed theme requirement. Give concrete and detailed examples for the course syllabus, detailed outline, laboratory material, student projects, or other instructional materials or methods.

Theme courses have the common goal of cultivating in students a number of habits of mind:

- **thinking ethically about important challenges facing our society and world;**
- **reflecting on the shared sense of responsibility required to build and maintain community;**
- **connecting knowledge and practice;**
- **fostering a stronger sense of our roles as historical agents.**

? The course builds student understanding of the science and engineering behind the technology addressed.

Students will develop in-depth understanding of the science, principles and history behind genome editing and engineering technologies. Students will learn how advances in basic research, such as understanding of DNA repair, DNA-protein interactions and virus defense mechanisms, have led to the development of the cutting-edge genome editing and engineering technologies. Students will have opportunities to design CRISPR reagents and observe how genome editing works in a lab grown plant.

Advances in genome editing and engineering are at the forefront of research in the biological sciences. By learning about these technologies and articulating views on their utility, students will be well positioned to engage with and evaluate new and emerging research in the biological sciences.

? Students discuss the role that society has played in fostering the development of technology as well as the response to the adoption and use of technology.

Students will discuss how societal needs can be addressed with genome editing and engineering technologies. We will use GMO and genome edited crops as examples to discuss how the

needs of farmers and consumers can be addressed by these technologies, how these technologies are adopted in different groups, and what are the responses to use of these technologies in different societies.

? Students consider the impact of technology from multiple perspectives that include developers, users/consumers, as well as others in society affected by the technology.

Students will discuss the impact of genome editing and engineering on individuals, industries, and societies. In class discussions sections will address on the impacts of these technologies on industry, agriculture, and commerce and how both scientists and ordinary citizens interact with the products of genome editing and engineering.

? Students develop skills in evaluating conflicting views on existing or emerging technology.

Student will develop skills in evaluating conflicting views on genome editing and engineering. Several lectures and discussion sections will focus on the ethics of these technologies. Students will be expected to discuss the benefits and drawbacks of utilizing these technologies.

? Students engage in a process of critical evaluation that provides a framework with which to evaluate new technology in the future.

Student will develop skills in evaluating conflicting views on genome editing and engineering. Several lectures and discussion sections will focus on the ethics of these technologies. Students will be expected to discuss the benefits and drawbacks of utilizing these technologies.

LE Recertification-Reflection Statement (for LE courses being re-certified only): <No text provided>

Statement of Certification:

This course is certified for a Core (blank) as of
This course is certified for a Theme (blank) as of

Writing Intensive

Propose this course as Writing Intensive curriculum: No

Question 1 (see CWB Requirement 1):

What types of writing (e.g., reading essay, formal lab reports, journaling) are likely to be assigned? Include the page total for each writing assignment. Indicate which assignment(s) students will be required to revise and resubmit after feedback by the instructor or the graduate TA.

<No text provided>

Question 2 (see CWB Requirement 2):

What types of writing (e.g., research papers, problem sets,

presentations, technical documents, lab reports, essays, journaling etc.) will be assigned? Explain how these assignments meet the requirement that writing be a significant part of the course work, including details about multi-authored assignments, if any. Include the required length for each writing assignment and demonstrate how the 2,500 minimum word count (or its equivalent) for finished writing will be met.

<No text provided>

Question 3 (see CWB Requirement 3):

How will students' final course grade depend on their writing performance? What percentage of the course grade will depend on the quality and level of the student's writing compared to the percentage of the grade that depends on the course content? Note that this information must also be on the syllabus.

<No text provided>

Question 4 (see CWB Requirement 4):

Write up a sample assignment handout here for a paper that students will revise and resubmit after receiving feedback on the initial draft.

<No text provided>

Question 5 (see CWB Requirement 5):

What types of instruction will students receive on the writing aspect of the assignments?

<No text provided>

Question 6 (see CWB Requirement 6):

How will the assistants be trained and supervised?

<No text provided>

Statement of Certification: This course is certified for a Theme (blank) as of

Course Syllabus

Course Syllabus:

Spring 2022
Genome Editing and Engineering (3 credits) BIOL 3051
CLE Society and Technology
course meets for 3 hours per week

Instructors:

Dr. Feng Zhang: zhangumn@umn.edu
Dr. Kyle Costa: kcosta@umn.edu

Office Hours: by appointment. Students should ask for clarification and assistance by speaking to the instructors before or after class. Come early and stay late. Time is provided in class for questions about worksheets and to speak in person to professors about scheduling out-of-class office hours.

Prerequisites: Foundations of Biology I and II (BIOL 1951/1951H and BIOL 2003/2003H) or Biol 1009 or BMEN 2501

Course Description:
Allowing researchers to modify genetic information in nearly any organism?s genome, genome editing and engineering technologies have been widely used in all areas of biology. These technologies have evolved rapidly in recent years and not only hold the promise to revolutionize medical and agricultural fields, but also make profound impacts on our society. The purpose of the course is to give students a comprehensive overview of principles, development and applications of genetic engineering and genome editing technologies in both prokaryotes and eukaryotes.

This course will introduce concepts and history of genome engineering in both prokaryotes and eukaryotes. We will discuss the mechanisms and applications of both techniques using examples in bacteria and plant genome and metabolic pathway engineering. Students will also have hands-on experience to design CRISPR and modify bacterial and plant genomes.

In addition, this course will contribute to students? liberal education by discussing the consequences of these technologies for society and technological development, including the

ethics of altering genomes, consequences on ecosystems, and the benefits, drawbacks, and limitations of these technologies.

Liberal Education Statement and Theme ? Technology and Society:
A liberal education prepares students to make informed decisions about important issues affecting them as individuals and as citizens of their local, national, and global communities. This course will contribute to your liberal education by discussing cutting edge technologies in genetic engineering/genome editing and the impact that these technologies have on society. We will discuss the ethics of manipulating genomes, potential positive and negative effects on individuals and ecosystems, safe implementation of genome engineering in industry and agriculture, and societal perception of genetically modified and gene edited organisms. Approximately 1/3 of class periods will be dedicated to discussions of these topics. Discussions will center around examples of genome engineering in the news. This course will teach students to think critically about the applications of genome engineering technologies.

This course will satisfy UMN?s technology and society theme by addressing the following:

? Students will learn in-depth of genome editing and engineering technologies and discuss the impact of these technologies on contemporary society. Literature will be presented and discussed on public acceptance and regulatory framework of these technologies and the derived products. Surveys will be conducted in class to facilitate discussion of student views of these technologies.
? Students will develop in-depth understanding of the science, principles and history behind genome editing and engineering technologies. Students will learn how advances in basic research, such as understanding of DNA repair, DNA-protein interactions and virus defense mechanisms, have led to the development of the cutting-edge genome editing and engineering technologies. Students will have opportunities to design CRISPR reagents and observe how genome editing works in a lab grown plant.
? Students will discuss how societal needs can be addressed with genome editing and engineering technologies. We will use GMO and genome edited crops as examples to discuss how the needs of farmers and consumers can be addressed by these technologies, how these technologies are adopted in different groups, and what are the responses to use of these technologies in different societies.
? Students will discuss the impact of genome editing and engineering on individuals, industries, and societies. In class discussions sections will address on the impacts of these technologies on industry, agriculture, and commerce and how both scientists and ordinary citizens interact with the products of genome editing and engineering.
? Student will develop skills in evaluating conflicting views on genome editing and engineering. Several lectures and discussion sections will focus on the ethics of these technologies. Students will be expected to discuss the benefits and drawbacks of utilizing these technologies.
? Advances in genome editing and engineering are at the forefront of research in the biological sciences. By learning about these technologies and articulating views on their utility, students will be well positioned to engage with and evaluate new and emerging research in the biological sciences.

Assessment of liberal education content: Discussions will be student led. Groups of students will research and prepare a summary of the issue at hand. This will be presented to the class (~25-minute presentation) with the second half of the period open to discussion. Discussions will include an extra take home question (worth 25 points) for students to critically evaluate and summarize these discussions.

Student Learning Outcome Addressed in discussions by:
Critically evaluate and respond to arguments Students will learn to interpret results and use rational, scientifically grounded arguments to defend a contention.
Identify and evaluate information sources Discussions of the importance of peer-reviewed vs. popular literature. Instruction in evaluating sources of information.
Gain scientific literacy in the techniques for genome editing and engineering Students will learn how to rationally design experiments to manipulate an organism?s genome and what experiments are considered ethical and appropriate.
Acquire skills to interpret and discuss data with both experts and non-experts We will discuss how to distill complex language from scientific studies into ?layman?s terms? so students can effectively communicate scientific data with the general public.

Text and Readings: All lecture slides, important papers, test materials, and interesting articles will be posted on the Canvas site. We will make extensive use of published articles and reviews, and will post primary literature for reading. We do not require you to purchase a textbook. Readings will be based on primary literature and will be posted to the Canvas website.
Appropriate Student Use of Class Notes and Course Materials: Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of

the academic community. For additional information, please see: https://policy.umn.edu/education/studentresp.
Makeup Work for Legitimate Absences: Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. Students with a legitimate absence will be provided with make-up assignments or exams. These make up assignments will be worth the same number of points as the missed work, but the content may be different. For complete information, please see: https://policy.umn.edu/education/makeupwork.

Class format:
50% Lecture
30% Discussion
20% Hands-on exercises (e.g. CRISPR in action, BRC tours, etc?)

Grading: 600 points total
Three exams worth 250 points (two 75-point exams and a 100-point cumulative final). Exams will be a mixture of multiple choice, true/false, short answer, problem solving, etc?

Take-home assignments worth 350 points total. These include:
1) Design of a CRISPR construct: 25 points
2) Quizzes and worksheets on Canvas: 200 points (~10 points per lecture)
3) Leading one discussion section with your group: 25 points
4) Writeups after discussion sections: 100 points (4 worth 25 points each)

S-N Students: A satisfactory (S) grade will be given if a total score of >69% of available points is achieved.

Incomplete: The grade of (I) will be considered only if the student has extraordinary circumstances that preclude them from completing the graded activities of the course. The student must have completed a substantial portion of the coursework with a passing grade and have the ability to complete the missing work within one semester. More details can be found here: https://onestop.umn.edu/academics/grading-policies

Grading Policy: We follow the college-wide CBS policy for grading

A 93 or greater % of total possible points
A- 90-92
B+ 87-89
B 83-86
B- 80-82
C+ 77-79
C 73-76
C- 69-72
D+ 67-68
D 60-66

F (or N) = Represents no credit, and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

Students who wish to contest an assignment grade must submit their assignment with a written explanation for why the grade should be reconsidered.

Requests must be submitted in person, within 1 week of the assignment being handed back.

University Libraries: The ultimate resource for research, the University library has five major facilities and eleven branch sites with a wealth of reference materials, online resources, books, articles, newspapers, microforms, government documents, maps and more. Librarians are available and happy to help orient students to all aspects of the library system. You can find research assistance at https://www.lib.umn.edu/.
Student Conduct Code: The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.
As a student at the University you are expected to adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_student_conduct_code.pdf
Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach and/or a student?s ability to learn.? The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based

requirements or related activities.
Use of Personal Electronic Devices in the Classroom: Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each instructor to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: https://policy.umn.edu/education/studentresp.
Scholastic Dishonesty: You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code: https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_student_conduct_code.pdf) If it is determined that a student has cheated, the student may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: https://policy.umn.edu/education/instructorresp.
The Office for Community Standards has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: https://communitystandards.umn.edu/avoid-violations/avoiding-scholastic-dishonesty. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class, e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.
Sexual harassment, sexual assault, stalking and relationship violence: The University prohibits sexual misconduct, and encourages anyone experiencing sexual misconduct to access resources for personal support and reporting. If you want to speak confidentially with someone about an experience of sexual misconduct, please contact your campus resources including the Aurora Center, Boynton Mental Health or Student Counseling Services (https://eoaa.umn.edu/report-misconduct). If you want to report sexual misconduct, or have questions about the University?s policies and procedures related to sexual misconduct, please contact your campus Title IX office or relevant policy contacts.
Instructors are required to share information they learn about possible sexual misconduct with the campus Title IX office that addresses these concerns. This allows a Title IX staff member to reach out to those who have experienced sexual misconduct to provide information about personal support resources and options for investigation. You may talk to instructors about concerns related to sexual misconduct, and they will provide support and keep the information you share private to the extent possible given their University role. https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_sexual_harassment_sexual_assault_stalking_and_relationship_violence.pdf
Equity, Diversity, Equal Opportunity, and Affirmative Action: The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, membership or activity in a local commission created for the purpose of dealing with discrimination, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_equity_diversity_equal_opportunity_and_affirmative_action.pdf.
Disability Accommodations: The University views disability as an important aspect of diversity, and is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.
? If you have, or think you have, a disability in any area such as, mental health, attention, learning, chronic health, sensory, or physical, please contact the DRC office on your campus (UM Twin Cities - 626.1333) to arrange a confidential discussion regarding equitable access and reasonable accommodations.
? Students with short-term disabilities, such as a broken arm, can often work with instructors to minimize classroom barriers. In situations where additional assistance is needed, students should contact the DRC as noted above.
? If you are registered with the DRC and have a disability accommodation letter dated for this semester or this year, please contact your instructor early in the semester to review how the accommodations will be applied in the course.
? If you are registered with the DRC and have questions or concerns about your accommodations please contact your (access consultant/disability specialist).
? Additional information: https://diversity.umn.edu/disability/, drc@umn.edu
Mental Health and Stress Management: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: http://www.mentalhealth.umn.edu.
Academic Freedom and Responsibility: Academic freedom is a cornerstone of the University.

Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*
Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.
* Language adapted from the American Association of University Professors "Joint Statement on Rights and Freedoms of Students".
?

Genome Editing and Engineering topics ? each topic is designed to cover ~1 week of class material and discussions will encompass one lecture period. Extra time will be used for in-class exams and exercises.

Topic 1: Overview of genetics, molecular biology and the birth of the modern age of genetic engineering. History of genetic engineering in prokaryotes. The challenges, breakthroughs, and development and features of each gene editing technology. Present and discuss the applications of gene editing in biotechnology.

Topic 2: History of genetic engineering in higher organisms. The challenges, breakthroughs, and development and features of each gene editing technology. Present and discuss the applications of gene editing in crop improvement.

Discussion 3: Truth and myth of genetic engineering. Pros, cons and bioethics, GMO vs. gene editing and regulatory framework.

Topic 4: Discovery of CRISPR and mechanisms for genetic engineering in prokaryotes. Mechanisms to introduce desired alterations while maintaining compliance with federal guidelines. What is appropriate for mass production? How can we maintain a safe environment when working with genetically modified microorganisms?

Topic 5: The birth of genome editing and mechanisms for genetic engineering/genome editing in eukaryotes. Introduce the distinct between genetic engineering and genome editing. How DNA repair works in eukaryotes, mechanisms of genetic engineering and genome editing in eukaryotic genomes, examples and applications of genetic engineering and genome editing in higher eukaryotes.

Discussion 6: Discussion on the ethics of genetic engineering/genome editing. Consideration, decision making process, designer baby.

Topic 7: Applications of genetic engineering/genome editing: metabolic engineering. Directing metabolism towards desired products. Avoiding unwanted side reactions. Design of regulatory circuits and designer metabolic pathways.

Topic 8: Applications of genetic engineering/genome editing: plant genome editing and crop improvement. How to make crops more productive and resilient to overcome the challenges from growing population and climate change. Improved photosynthesis, drought and heat tolerance.

Discussion 9: Discussion on good practice of genetic engineering/genome editing. Good manufacturing practice (GMP) considerations, ethics, regulatory etc.?

Topic 10: Genetic engineering, genome editing and synthetic biology: building synthetic pathways, genomes and organisms. Considerations, building novel pathways and synthetic microbes.

Discussion 11: Discussion on synthetic biology. How do we design an organism to produce a product? Considerations of societal benefit, social perceptions, etc? Public confidence in the science of gene manipulation.

Topic 12: Genetic Engineering and genome editing in action for prokaryotes: Hands on experiments on prokaryotic genetic engineering, and tours of Biotechnology Resource Center.

Topic 13: CRISPR in action: The evolution of CRISPR technologies; the challenges and breakthroughs. Learn how different CRISPR/Cas systems work, including CRISPR/Cas9, CRISPRi, CRISPRa and Base editor technologies

Topic 14: CRISPR in action for plant genome editing: Development of CRISPR technologies in plants. How to use CRISPR to mutate plant genes using a real example in tobacco including

how to build CRISPR constructs, deliver CRISPR into plant cells and observe the mutant phenotypes within 2 weeks.

Discussion 15: Discussion on GMO and gene edited plants: Genetically modified foods, benefits and risks, GMO versus gene edited crops, should they be regulated differently?

Strategic Objectives & Consultation

Name of Department Chair Approver:

Peter Tiffin

Strategic Objectives - Curricular Objectives:

How does adding this course improve the overall curricular objectives of the unit?

(no text provided)

Strategic Objectives - Core Curriculum:

Does the unit consider this course to be part of its core curriculum?

(no text provided)

Strategic Objectives - Consultation with Other Units:

Before submitting a new course proposal in ECAS, circulate the proposed syllabus to department chairs in relevant units and copy affiliated associate dean(s). Consultation prevents course overlap and informs other departments of new course offerings. If you determine that consultation with units in external college(s) is unnecessary, include a description of the steps taken to reach that conclusion (e.g., catalog key word search, conversation with collegiate curriculum committee, knowledge of current curriculum in related units, etc.). Include documentation of all consultation here, to be referenced during CCC review. If email correspondence is too long to fit in the space provided, paraphrase it here and send the full transcript to the CCC staff person. Please also send a Word or PDF version of the proposed syllabus to the CCC staff person.

Biol 3051Genome Editing and Engineering was approved on November 20, 2020 by the CBS Education Policy Committee. On Feb 5, 2021, the syllabus was shared with Associate Deans Ascan Koerner (CLA) Christine Mueller (Nursing), Michael White and Hal DeLaRosby (CFANS), Michelle Koker (CCAPS), Nicola Alexander (CEHD) Paul Strykowski (CSE), Raj Singh (CSOM), and Sauman Chu (CDES).
The following feedback was received:
Nursing: no conflicts
CSOM: Carlson has no concerns of overlap or any other concerns.
CDES: Hi John, The College of Design has no concerns about these two classes.
CCAPS: Hi, John. No concerns re: overlap with CCAPS's curriculum.
CFANS: The College of Food, Agricultural and Natural Resource Sciences has no concerns with the courses as proposed.

Back to Proposal List