

Cover Sheet: Request 11708

MCB 4XXX Applications and Technologies of Synthetic Biology

Info

Process	Course New Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Monika Oli molli@ufl.edu
Created	6/15/2017 9:59:59 AM
Updated	9/17/2020 2:51:28 PM
Description of request	Approval of new course: Applications and Technologies of Synthetic Biology- MCB 4xxx

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Microbiology and Cell Science 514910000	Eric Triplett		6/15/2017
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Email sent to submitter with comments.	8/31/2017
No document changes					
Department	Approved	CALS - Microbiology and Cell Science 514910000	Eric Triplett		12/12/2017
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	This request has been recycled by the CALS CC. Needed corrections were sent to the submitter on 1/29/18.	2/7/2018
No document changes					
Department	Approved	CALS - Microbiology and Cell Science 514910000	Eric Triplett		3/9/2018
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Recycled by CALS Curriculum Committee. Comments will be sent to submitter.	5/7/2018
No document changes					
Department	Approved	CALS - Microbiology and Cell Science 514910000	Eric Triplett		8/8/2018
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Recycled by the CAL CC on 10/12/18. Comments sent to submitter.	11/5/2018
No document changes					
Department	Approved	CALS - Microbiology and Cell Science 514910000	Eric Triplett		6/6/2019

Step	Status	Group	User	Comment	Updated
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Recycled per department chair request.	6/9/2019
No document changes					
Department	Approved	CALS - Microbiology and Cell Science 514910000	Eric Triplett		10/28/2019
No document changes					
College	Approved	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Approved by the CALS CC on 11/15/19.	11/22/2019
No document changes					
University Curriculum Committee	Commented	PV - University Curriculum Committee (UCC)	Lee Morrison	Added to the December agenda.	12/10/2019
No document changes					
University Curriculum Committee	Recycled	PV - University Curriculum Committee (UCC)	Casey Griffith	Please respond to the UCC comments/questions sent in previous email.	12/17/2019
No document changes					
College	Approved	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Edits requested by the UCC have been addressed.	9/17/2020
Reisch UCC consults 2020-2.pdf					9/16/2020
Reisch MCB4XXX syllabus 9-17-2020.docx					9/17/2020
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			9/17/2020
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 11708

Info

Request: MCB 4XXX Applications and Technologies of Synthetic Biology

Description of request: Approval of new course: Applications and Technologies of Synthetic Biology-
MCB 4xxx

Submitter: Monika Oli moli@ufl.edu

Created: 9/16/2020 12:56:42 PM

Form version: 7

Responses

Recommended Prefix MCB

Course Level 4

Number xxx

Category of Instruction Advanced

Lab Code None

Course Title Applications and Technologies of Synthetic Biology

Transcript Title Synthetic Biology

Degree Type Baccalaureate

Delivery Method(s) Online, UF Online - Please attach a letter of support from the Director of the UF
Online program

Co-Listing No

Effective Term Earliest Available

Effective Year Earliest Available

Rotating Topic? No

Repeatable Credit? No

Amount of Credit 3

S/U Only? No

Contact Type Regularly Scheduled

Weekly Contact Hours 3

Course Description Synthetic biology is the the construction and reconstruction of biological systems, and its practical applications in research and industry. Advanced molecular biology tools for DNA assembly, the construction of biological pathways and circuits, genome editing, and strategies for transcriptional control will be examined in the course.

Prerequisites MCB 3020 or MCB 3023

Co-requisites N/A

Rationale and Placement in Curriculum This course is an important addition to our curriculum, explaining the most current technologies to our students. None of the other course cover the topics discussed in this class.

Course Objectives 1. Define synthetic biology and understand its importance in the 21st century.

2. Classify and analyze biological parts and their function on the systems level.

3. Describe and discuss advanced molecular biology techniques that facilitate the building of biological parts and systems.

4. Argue both sides of ethical decisions and containment strategies in synthetic biology

Course Textbook(s) and/or Other Assigned Reading N/A

Primary papers and literature are listed week by week

Weekly Schedule of Topics Date (week) Topic Readings

1 Introduction to Synthetic Biology, Molecular Biology, and Biochemistry Foundations for engineering biology Endy, D. (2005). Nature, 438(7067), 449–453.

A brief history of synthetic biology Cameron, D. E., Bashor, C. J., & Collins, J. J. (2014). Nature Reviews Microbiology, 12(5), 381–390.

- 2 - 3 Biological Parts – Promoters, Regulators, Genes, Terminators, Proteins Design, construction and characterization of a set of insulated bacterial promoters. Davis, J. H., Rubin, A. J., & Sauer, R. T. (2011). *Nucleic Acids Research*, 39(3), 1131–1141.
Automated design of synthetic ribosome binding sites to control protein expression. Salis, H. M., Mirsky, E. A., & Voigt, C. A. (2009). *Nature Biotechnology*, 27(10), 946–950.
Characterization of 582 natural and synthetic terminators and quantification of their design constraints. Chen YJ1, Liu P, Nielsen AA, Brophy JA, Clancy K, Peterson T, Voigt CA. *Nature Methods*,(7) 659-64
- 4 Controlling Gene Expression and Protein Production, Independent and tight regulation of transcriptional units in *Escherichia coli* via the LacR/O, the TetR/O and AraC/I1-I2 regulatory elements. 1997. R Lutz and H Bujard, *Nucleic Acids Res.* 25(6): 1203–1210.
Synthetic Riboswitches That Induce Gene Expression in Diverse Bacterial Species. Topp, S ... J.P. Gallivan, *Applied and Environmental Microbiology*.
- 5 Recombinant DNA technologies, Cloning techniques and strategies Polymerase Chain Reaction
https://en.wikipedia.org/wiki/Polymerase_chain_reaction
The SLIC, Gibson, CPEC and SLiCE assembly methods (and GeneArt® Seamless, In-Fusion® Cloning)
<https://j5.jbei.org/j5manual/pages/22.html>
Enzymatic assembly of DNA molecules up to several hundred kilobases. Gibson, D. G., Young, L., Chuang, R.-Y., Venter, J. C., Hutchison, C. A., & Smith, H. O. (2009). *Nature Methods*, 6(5), 343–345.
- 6 Artificial Gene Circuits, Noise in Gene Expression, Test 1 Construction of a genetic toggle switch in *Escherichia coli*
Collins, J. J., Gardner, T. S., & Cantor, C. R. (2000). *Nature*, 403(6767), 339–342.
- 7 BioSensors – Construction and Application Synthetic biology devices for in vitro and in vivo diagnostics
Slomovic, S., Pardee, K., & Collins, J. J. (2015). *PNAS* 112(47), 14429–14435.
<https://doi.org/10.1073/pnas.1508521112>
- 8 - 9 Genome Editing - Transposons, Recombinases, Zinc Fingers, TALEN's, CRISPR/Cas9 ZFN, TALEN, and CRISPR/Cas-based methods for genome engineering. Gaj, T., Gersbach, C. A., & Barbas, C. F. (2013). ZFN, TALEN, and CRISPR/Cas-based methods for genome engineering. *Trends in Biotechnology*, 31(7), 397–405.
Strecker, J. ... Zhang, F. (2019). RNA-guided DNA insertion with CRISPR-associated transposases. *Science*, 364(6448), 48–53.
- 10 DNA synthesis and Assembly, Test 2 Large-scale de novo DNA synthesis: technologies and applications. Kosuri, S., & Church, G. M. (2014). Large-scale de novo DNA synthesis: technologies and applications. *Nature Methods*, 11(5), 499–507.
- 11 Metabolic Engineering – Techniques and Applications, Metabolic evolution of energy-conserving pathways for succinate production in *Escherichia coli*. Zhang, X., Jantama, K., Moore, J. C., Jarboe, L. R., Shanmugam, K. T., & Ingram, L. O. (2009). *PNAS* 106(48), 20180–5.
Production of the antimalarial drug precursor artemisinin acid in engineered yeast. Ro, D.-K., Paradise, E. M., Ouellet, M., Fisher, K. J., Newman, K. L., Ndungu, J. M., ... Keasling, J. D. (2006). *Nature*, 440(7086), 940–943.
- 12 Accelerated Evolution Systems - MAGE, PACE, A system for the continuous directed evolution of biomolecules. Esvelt, K. M., Carlson, J. C., & Liu, D. R. (2011). *Nature*, 472(7344), 499–503.
- 13 Synthetic Cells - Recoded *E. coli* and JCVIsyn1-3.0 Total synthesis of *Escherichia coli* with a recoded genome.
J. Fredens... J.W. Chin. *Nature* 569, 514–518 (2019)
Genomically Recoded Organisms Expand Biological Functions. Lajoie, M. J.... Isaacs, F. J. (2013). Genomically Recoded Organisms Expand Biological Functions. *Science*, 342(6156), 357–360.
Design, synthesis, and testing toward a 57-codon genome
Ostrov, N., Landon, M., Guell, M., Kuznetsov, G., Teramoto, J., Cervantes, N., ... Church, G. M. (2016). *Science*, 353(6301), 819–822.

14 Containment strategies, Ethical considerations Biocontainment of genetically modified organisms by synthetic protein design Mandell, D. J., Lajoie, M. J., Mee, M. T., Takeuchi, R., Kuznetsov, G., Norville, J. E., ... Church, G. M. (2015). *Nature*, 518(7537)

Links and Policies Class Attendance and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation - 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Campus Resources

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.

On-Line Students Complaints: View the Distance Learning Student Complaint Process.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Click here for guidance on how to give feedback in a professional and respectful manner. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students here.

Netiquette guide for online courses

It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette.

<http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Click here to read the Honor Code. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Additional comments regarding academic integrity:

Students are encouraged to discuss material with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:

- Have another person complete a quiz in this course
- Copy another student's quiz in this course
- Collaborate with anyone during a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz window is still open
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).
- Use any materials provided by a previous student in the course

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Microsoft Office 365 Software is free for UF students

<http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/>

Other free software is available at:

<http://www.software.ufl.edu/>

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process

The University of Florida and most instructors believe strongly in the ability of students to express concerns regarding their experiences at the University. Most problems, questions and concerns about courses can be resolved by professionally communicating with the instructor. Please try to meet your instructor in person, make an appointment to call, or try to set up a remote meeting through Skype or other media.

If this does not help the University encourages the students who wish to file a written complaint to submit that complaint directly to the department that manages that course. If a problem really persists and cannot be resolved by communicating with the instructor and the department, contact... for Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

Online Course: <http://www.distance.ufl.edu/student-complaint-process>

This said, professionalism is a two-way-street. Unprofessional behavior of students includes, among

other things: lack of communication, blaming other people or external factors, lying, affecting others negatively in a group or in the class, not accepting criticism and not being proactive in solving problems or seeking help. Furthermore, faculty often have family and other obligations to tend to. Over the weekend, replies to your inquiries or questions may be delayed.

If a student is lacking professionalism repeatedly, the instructor has the rights to file formal complaint against the student through the Dean of Student office.

Additional Information:

Instructors are reminded that any use of students as subjects in research projects MUST receive clearance from the "human subjects" board PRIOR to beginning the project. This policy also includes any survey research or research done by undergraduate or graduate students for class assignments.

The syllabi for all courses and sections offered each semester must be posted on publicly accessible websites. A college may choose to meet this requirement by posting all its syllabi on a single site or on the web pages of individual departments. Syllabi must be posted at least three days prior to the first day of classes and must be retained on this site for at least three complete semesters (counting summer as a single semester).

Grading Scheme Evaluation of Learning/Grades

	# each	points each	Total points	
Exams	3	100	300	
Discussions	5	80	400	
Quizzes	15	70	1050	
Homework	5	50	250	
Proposal Abstract		1	25	25
Proposal Outline		1	25	25
Proposal Final	1	50	50	

Total points 2100

Exams

There will be 3 exams administered throughout the semester at approximately 5-week intervals. All material covered during class will be subject to testing. Tests are conceptually cumulative because understanding of topics covered early in the course will be required to understand materials covered later in the course. Exams will be composed of multiple choice, fill in the blank, and essay questions. There will be three essay questions from each module, but you will only be required to answer one or two question from each module.

Discussion, Quizzes, Homework

Quizzes (70 points) – There will be a non-proctored quiz at the end of each module. The quizzes are intended to help you find out how well you know the material.

Discussion groups (80 points) – The class will be divided into discussion groups of approximately 15-20 students. The purpose of the discussion group is to encourage student-student interaction and peer learning. Students are free to ask and answer questions on the discussion group. I will moderate the responses and also pose questions to facilitate the discussion. Each student will be required to post at least once during each module, half of the discussion group will be required to post during the first week of a module and the other half during the second. Check the due dates on Canvas to know which group you are in for each module. Each module will have a separate group and each group will close after 2-3 weeks.

Homework (50 points) – There will be homework assignments that will be exercises based on material we have learned. For example, you will be asked to design a plasmid and describe its function.

Proposals

Each student will be responsible for writing a research proposal that aims to investigate a novel idea in the field of synthetic biology that is of scientific or industrial interest. The proposal should be 3-4 pages single spaced. A brief rubric of the proposal is provided below.

Introduction (1 page) – Clearly provide relevant background information in the context of research that has previously been performed in synthetic biology and fields related to your topic. At least 5 sources of primary research papers or literature reviews must be cited.

Significance and Novelty (0.5-1 page) – Identify the gap in knowledge that your proposal will address. Explain why this work is important to the field. What are the benefits to science and society that will result from successful completion of this work? Demonstrate that you understand the subject matter and its greater implications. Cite the primary literature and reviews as necessary.

Experimental Plan (1-2 pages) – Describe 1 research aim that will be used to address the gap in knowledge identified above. Provide a logical workflow that will be used to investigate the research question. The purpose of the experiments should be clear, but the exact experimental conditions do not need to be provided.

information on grades and grading policies is here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Grading Policy

Final letter grades will be assigned based on the number of points earned, as follows:

Grade	Percent	Points
Grading policy A	92	1932
A-	90	1890
B+	88	1848
B	82	1722
B-	80	1680
C+	78	1638
C	72	1512
C-	70	1470
D+	68	1428
D	62	1302
E	<62	<1302

More information on grades and grading policies is found at link to the university grades and grading policies.

Instructor(s) Dr. Christopher Reisch - creisch@ufl.edu

Applications and Technologies of Synthetic Biology

MCB 4XXX, Fall- 2020

Instructor

Dr. Christopher Reisch - creisch@ufl.edu

Microbiology and Cell and Science, Office – MCS 1152

Preferred methods for communication with the instructor regarding the course is through email.

Office Hours

Monday 9-10 am, Wednesday 1-2pm via zoom

Delivery Method/Meeting time

Online (asynchronous)

Credits

3-Credit hours

Course Description

This course will introduce the concept of synthetic biology, which is loosely defined as the construction and reconstruction of biological systems, and its practical applications in research and industry. Advanced molecular biology tools for DNA assembly, the construction of biological pathways and circuits, genome editing, and strategies for transcriptional control will be examined in the course.

Course Objectives/Goals/Learning Outcomes

Students enrolled in this course will be able to:

1. Define synthetic biology and understand its importance in the 21st century.
2. Classify and analyze biological parts and their function on the systems level.
3. Describe and discuss advanced molecular biology techniques that facilitate the building of biological parts and systems.
4. Argue both sides of ethical decisions and containment strategies in synthetic biology

Prerequisites

MCB 3020 or MCB 3023 with a grade of C or better.

Course Material and Assignments

All required course materials will be available through the Canvas e-Learning site (<http://elearning.ufl.edu/>). Instructions for and submission of assignments will also be through Canvas.

Required Textbooks

There is no required textbook.

Required reading materials will be posted to Canvas.

Weekly Course Schedule

ate eek)	Topic	Readings
1	Introduction to Synthetic Biology, Molecular Biology, and	Foundations for engineering biology Endy, D. (2005). Nature, 438(7067), 449–45

	Biochemistry	A brief history of synthetic biology Cameron, D. E., Bashor, C. J., & Collins, J. J. (2010). Nature Reviews Microbiology, 12(5), 381–390.
- 3	Biological Parts – Promoters, Regulators, Genes, Terminators, Proteins	Design, construction and characterization of a set of insulated bacterial promoters Davis, J. H., Rubin, A. J., & Sauer, R. T. (2011). Nucleic Acids Research, 39(3), 1131–1141. Automated design of synthetic ribosome binding sites to control protein expression http://www.nature.com/nbt/journal/v27/n10/full/nbt.1568.html Salis, H. M., Mirsky, E. A., & Voigt, C. A. (2009). Nature Biotechnology, 27(10), 946–950.
4	Controlling Gene Expression and Protein Production,	Independent and tight regulation of transcriptional units in Escherichia coli via the LacR/O, the TetR/O and AraC/I1-I2 regulatory elements. 1997. R Lutz and H Buja Nucleic Acids Res. 25(6): 1203–1210.
5	Artificial Gene Circuits, Noise in Gene Expression, Test 1	Construction of a genetic toggle switch in Escherichia coli Collins, J. J., Gardner, T. S., & Cantor, C. R. (2000). Nature, 403(6767), 339–342.
6	BioSensors – Construction and Application	Synthetic biology devices for in vitro and in vivo diagnostics Slomovic, S., Pardee, K., & Collins, J. J. (2015). PNAS 112(47), 14429–14435. https://doi.org/10.1073/pnas.1508521112
7	Recombinant DNA technologies, Cloning techniques and strategies	Polymerase Chain Reaction https://en.wikipedia.org/wiki/Polymerase_chain_reaction The SLIC, Gibson, CPEC and SLiCE assembly methods (and GeneArt® Seamless, Gateway® and InFusion® Cloning) https://j5.jbei.org/j5manual/pages/22.html Enzymatic assembly of DNA molecules up to several hundred kilobases Gibson, D. G., Young, L., Chuang, R.-Y., Venter, J. C., Hutchison, C. A., & Smith, H. O. (2009). Nature Methods, 6(5), 343–345.
- 9	Genome Editing - Transposons, Recombinases, Zinc Fingers, TALEN's, CRISPR/Cas9	ZFN, TALEN, and CRISPR/Cas-based methods for genome engineering Gaj, T., Gersbach, C. A., & Barbas, C. F. (2013). ZFN, TALEN, and CRISPR/Cas-based methods for genome engineering. Trends in Biotechnology, 31(7), 397–405.
10	DNA synthesis and Assembly, Test 2	Large-scale de novo DNA synthesis: technologies and applications Kosuri, S., & Church, G. M. (2014). Large-scale de novo DNA synthesis: technologies and applications. Nature Methods, 11(5), 499–507.
11	Metabolic Engineering – Techniques and Applications,	Metabolic evolution of energy-conserving pathways for succinate production in Escherichia coli http://www.pnas.org/content/106/48/20180.full Zhang, X., Jantama, K., Moore, J. C., Jarboe, L. R., Shanmugam, K. T., & Ingram, L. T. (2009). PNAS 106(48), 20180–5. Production of the antimalarial drug precursor artemisinic acid in engineered yeast Ro, D.-K., Paradise, E. M., Ouellet, M., Fisher, K. J., Newman, K. L., Ndungu, J. M., et al. (2006). Nature, 440(7086), 940–943.

12	Accelerated Evolution Systems - MAGE, PACE,	A system for the continuous directed evolution of biomolecules Esvelt, K. M., Carlson, J. C., & Liu, D. R. (2011). <i>Nature</i> , 472(7344), 499–503.
13	Synthetic Cells - Recoded <i>E. coli</i> and JCVIsyn1-3.0	Genomically Recoded Organisms Expand Biological Functions Lajoie, M. J., Rovner, A. J., Goodman, D. B., Aerni, H.-R., Haimovich, A. D., Kuznetsov, G., ... Isaacs, F. J. (2013). Genomically Recoded Organisms Expand Biological Functions. <i>Science</i> , 342(6156), 357–360. Design, synthesis, and testing toward a 57-codon genome Ostrov, N., Landon, M., Guell, M., Kuznetsov, G., Teramoto, J., Cervantes, N., ... Church, G. M. (2016). <i>Science</i> , 353(6301), 819–822.
- 15	Containment strategies, Ethical considerations	Biocontainment of genetically modified organisms by synthetic protein design Mandell, D. J., Lajoie, M. J., Mee, M. T., Takeuchi, R., Kuznetsov, G., Norville, J. E., Church, G. M. (2015). <i>Nature</i> , 518(7537)

Exam Dates/Calendar/Critical dates and deadlines

Week 5 - Test 1

Week 6 - Proposal Abstracts Due

Week 9 – Proposal Outline Due

Week 10 – Test 2

Week 14 – Proposal Due

Week 15 – Test 3

Exam Administration - ProctorU

All exams will be administered through ProctorU using Canvas in E-learning with students using personal computers. The exam may be taken at any location approved by ProctorU during previously announced times.

For students to sign up for a ProctorU account go to:

<http://www.proctoru.com/forstudents.php>

Evaluation of Learning/Grades

	# each	points each	Total points
Exams	3	100	300
Discussions	5	80	400
Quizzes	15	70	1050
Homework	5	50	250
Proposal Abstract	1	25	25
Proposal Outline	1	25	25
Proposal Final	1	50	50
		Total points	2100

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Discussion, Quizzes, Homework

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intended to help you find out how well you know the material.

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Grading Policy

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	Grade	Percent	Points
Grading policy	A	92	1932
	A-	90-91.9	1890
	B+	88-89.9	1848
	B	82-87.9	1722
	B-	80-81.9	1680
	C+	78-79.9	1638
	C	72-77.9	1512
	C-	70-71.9	1470
	D+	68-69.9	1428
	D	62-67.9	1302
	E	<62	<1302

More information on grades and grading policies is found at <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

Class Attendance and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation - 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Campus Resources

Health and Wellness

U Matter, We Care : If you or someone you know is in distress, please contact umatter@ufl.edu , 352-392-1575, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center : [Visit the Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center : Call 352-392-1161 for 24/7 information to help you find the care you need, or [visit the Student Health Care Center website](#) .

University Police Department : [Visit UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road,

Gainesville, FL 32608; [Visit the UF Health Emergency Room and Trauma Center website](#) .

Academic Resources

E-learning technical support : Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at helpdesk@ufl.edu .

[Career Connections Center](#) : Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

[Library Support](#) : Various ways to receive assistance with respect to using the libraries or finding resources.

[Teaching Center](#) : Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

[Writing Studio](#) : 2215 Turlington Hall , 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus : [Visit the Student Honor Code and Student Conduct Code webpage for more information](#) .

On-Line Students Complaints : [View the Distance Learning Student Complaint Process](#)

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. [Click here for guidance on how to give feedback in a professional and respectful manner](#) . Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/ . [Summaries of course evaluation results are available to students here](#) .

Netiquette guide for online courses

It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. [Click here to read the Honor Code](#) . Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Additional comments regarding academic integrity :

Students are encouraged to discuss material with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:

- Have another person complete a quiz in this course
- Copy another student’s quiz in this course
- Collaborate with anyone during a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz window is still open
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).
- Use any materials provided by a previous student in the course

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Microsoft Office 365 Software is free for UF students

<http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/>

Other free software is available at:

<http://www.software.ufl.edu/>

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process

The University of Florida and most instructors believe strongly in the ability of students to express concerns regarding their experiences at the University. Most problems, questions and concerns about courses can be resolved by professionally communicating with the instructor. Please try to meet your instructor in person, make an appointment to call, or try to set up a remote meeting through Skype or other media.

If this does not help the University encourages the students who wish to file a written complaint to submit that complaint directly to the department that manages that course. If a problem really persists and cannot be resolved by communicating with the instructor and the department, contact... for

Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

Online Course: <http://www.distance.ufl.edu/student-complaint-process>

This said, professionalism is a two-way-street. Unprofessional behavior of students includes, among other things: lack of communication, blaming other people or external factors, lying, affecting others negatively in a group or in the class, not accepting criticism and not being proactive in solving problems or seeking help. Furthermore,

faculty often have family and other obligations to tend to. Over the weekend, replies to your inquiries or questions may be delayed.

If a student is lacking professionalism repeatedly, the instructor has the rights to file formal complaint against the student through the Dean of Student office.

Additional Information:

Instructors are reminded that any use of students as subjects in research projects **MUST** receive clearance from the "human subjects" board **PRIOR** to beginning the project. This policy also includes any survey research or research done by undergraduate or graduate students for class assignments.

The syllabi for all courses and sections offered each semester must be posted on publicly accessible websites. A college may choose to meet this requirement by posting all its syllabi on a single site or on the web pages of individual departments. Syllabi must be posted at least three days prior to the first day of classes and must be retained on this site for at least three complete semesters (counting summer as a single semester).

External Consultation Results (departments with potential overlap or interest in proposed course, if any)

Department <u>Agricultural and Biological Engineering</u>	Name and Title Dorota Z. Haman - Professor and Chair
Phone Number (352) 392-1864 ext 120	E-mail <u>dhaman@ufl.edu</u>
Comments Dr. Haman identified two courses with the potential for minor overlap, but she was happy that the course would be offered at UF.	

Department <u>Molecular Genetics and Microbiology</u>	Name and Title Henry V. Baker, Professor and Chair
Phone Number (352) 273-5935	E-mail <u>baker@mgm.ufl.edu</u>
Comments Dr. Baker saw no potential overlap and believed that the course would complement existing courses in MGM.	

Department <u>Biochemistry and Molecular Biology</u>	Name and Title James Flanagan, Professor and Chair
Phone Number (352) 294-8384	E-mail <u>flanegan@ufl.edu</u>
Comments See attached correspondence. Dr. Flanagan and Dr. Tom Yang found a "relatively small amount of overlap" with courses in BMB, though the overlap is not a concern to the department.	

External Consultation Results (departments with potential overlap or interest in proposed course, if any)

Department Biology	Name and Title Prof. Marta Wayne
Phone Number 352-392-9925	E-mail mlwayne@ufl.edu
<p>Comments</p> <p>The Department of Biology is also offering a course on synthetic biology taught by Dr. Ed Braun. Dr. Braun and I have been in contact and aim to make the two courses complementary and not competing. See the attached correspondance for details on the the specifics of each course.</p>	

Department _____	Name and Title _____
Phone Number _____	E-mail _____
<p>Comments</p>	

Department _____	Name and Title _____
Phone Number _____	E-mail _____
<p>Comments</p>	