Course ID:	Course Title:	Winter 2020
BIO 329	Molecular Genetics	Prerequisite: BIO 211 and BIO 231
		Credits: 3

Class Information		Instructor Information		Important Dates	
Days:	Tuesday and Thursday	**Instructor:**	Dr. Chris Wang	**First day of classes:**	Tue, Jan 7
Time:	8:15 – 9:30	**Email:**	chris.wang@ambrose.edu	**Last day to add/drop, or change to audit:**	Sun, Jan 19
Room:	A2212	**Phone:**	(403) 410-2000 ext. 6910	**Last day to request revised exam:**	Mon, Mar 9
Lab	Wednesday (**A2145**)	**Office:**	L2113	**Last day to withdraw from course:**	Fri, Mar 20
	16:00 – 18:45	**Office Hours:**	by appointment (open door policy)	**Last day to apply for coursework extension:**	Mon, Mar 30
Final Exam:				**Last day of classes:**	Thurs, Apr 9

Course Description

This course will study the structure of genes and the molecular mechanisms that regulate gene expression in prokaryotes and eukaryotes. Topics include gene and chromosome structures, DNA recombination and mechanisms of DNA replication and repair, transcription, post-transcriptional RNA processing, translation, and posttranslational modifications. Students in this lecture-based course also learn the theory of basic molecular techniques, such as quantitative PCR and gene silencing.

Expected Learning Outcomes

Students who successfully completed the course will be able to:
1. explain the processes of DNA replication, repair, and recombination
2. explain the processes and regulation of RNA transcription
3. describe the genetic code, and the processes and regulation of translation
4. explain the role of regulatory RNAs
5. describe and explain typical molecular laboratory techniques
6. develop strategies to address molecular genetics problems experimentally

Textbooks (Required):

• Molecular Biology of the Gene, 7th Edition.James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, and Richard Losick. 2014. Cold Spring Harbor Laboratory Press.

• Mastering Biology Course ID: **wang21671**
  ▪ sing-up link: www.pearson.com/mastering

Textbooks (Recommended):

• A Genetic Switch, 3rd Edition. Mark Ptashne. 2004. Cold Spring Harbor Laboratory Press.
  ▪ Figure can be downloaded at http://www.cshteaching.org/AGeneticSwitch.php

  ▪ A Genetic Switch Lecture Series can be viewed at:
    https://www.mskcc.org/research/ski/labs/mark-ptashne/genetic-switch-lecture-series

Laboratory Bioinformatic Software:

• free sign up for Benchling at https://www.benchling.com/academic/

Tentative Course Schedule

The following schedule provides a general guideline and timetable for topics and tests. It may change depending on progress through the semester.

Date	Lecture Topic	Readings (Watson et al. 7th Ed)
	Laboratory Objective	
Jan. 07	Introduction to BIO 329 lecture	
	Introduction to BIO 329 lab	
Jan. 09	Topic 1 - Genetic Regulation: A Genetic Switch	798 – 802; 636 - 652 Ptashne: Intro; Ch. 1-2
Jan. 14	Topic 1 - Genetic Regulation: A Genetic Switch	798 – 802; 636 - 652 Ptashne: Intro; Ch. 1-2
	Lab 1 – Miniprep	
Jan. 16	Topic 1 - Genetic Regulation: A Genetic Switch	798 – 802; 636 - 652 Ptashne: Intro; Ch. 1-2
Jan. 21	Topic 2 - Protein-DNA Interaction and Gene Control	121 - 129; 134 - 135; 137 - 139; 615 - 620
	Lab 2 – PCR of A/B/C Insert and Restriction Digest of *pL4440* plasmid	
Jan. 23	Topic 2 - Protein-DNA Interaction and Gene Control	121 - 129; 134 - 135; 137 - 139; 615 - 620
Jan. 28	Topic 3 - DNA Structure and Topology	77-105 (Chapter 4)
	Lab 3 – Check for PCR Products and Gel Purification of *pL4440*	
Jan. 30	*Program Day (No Class)*	
Feb. 04	Topic 3 - DNA Structure and Topology	77-105 (Chapter 4)
	Lab 4 – Gel Purification of PCR Product, T-tailing of *pL4440*, and Ligation	
Feb. 06	Topic 3 - DNA Structure and Topology	77-105 (Chapter 4)
Feb. 11	Topic 4 - RNA Structure and Variety	107-120 (Chapter 5)
	Lab 5 – Make Competent Cells and Transformation	
Feb. 13	***In-Class Midterm Exam***	
Feb. 18	*Winter Reading Week (No Class)*	147-190 (Chapter 7)
	Winter Reading Week (No Class)	147-190 (Chapter 7)
Feb. 20	*Winter Reading Week (No Class)*	147-190 (Chapter 7)
Feb. 25	Topic 5 – Molecular Biology Techniques (Student-led Lecture)	147-190 (Chapter 7)
	Lab 6 – PCR Colony Screening	

Feb. 27	Topic 5 – Molecular Biology Techniques (Student-led Lecture)	147-190 (Chapter 7)
Mar. 03	Topic 5 – Molecular Biology Techniques (Student-led Lecture)	147-190 (Chapter 7)
	Lab 7 – Determining Positive Clones and Preparation Sample for DNA Sequencing	
Mar. 05	Topic 6 - Genomic Structure, Chromatin, and the Nucleosome	199-256 (Chapter 8)
Mar. 10	Topic 6 - Genomic Structure, Chromatin, and the Nucleosome	199-256 (Chapter 8)
	Lab 8 – Transformation and Set Up of RNAi plates	
Mar. 12	Topic 7 – Eukaryotic DNA Replication	257-312 (Chapter 9)
Mar. 17	Topic 8 – Eukaryotic Transcription	429-466 (Chapter 13) 657-700 (Chapter 19)
	Lab 9 – RNAi Experiment	
Mar. 19	Topic 8 – Eukaryotic Transcription	429-466 (Chapter 13) 657-700 (Chapter 19)
Mar. 24	Topic 8 – Eukaryotic Transcription	429-466 (Chapter 13) 657-700 (Chapter 19)
	Lab 10 – Phenotypic Analysis (timing can be flexible due to ARC on Mar. 25th)	
Mar. 26	Topic 9 – RNA Splicing	467-507 (Chapter 14)
Mar. 31	Topic 9 – RNA Splicing	467-507 (Chapter 14)
	Lab 11 – Open Lab	
Apr. 02	Topic 10 – Translation	509-571 (Chapter 15)
Apr. 07	Topic 11 – Regulatory RNAs	701-731 (Chapter 20)
	Lab 12 – **Lab Exam**	
Apr. 09	Lecture Overflow **Lab Report Due on Apr. 10**	

Requirements:

• Mastering Biology subscription (please see the textbook section above)

• students are encouraged to read the corresponding chapter prior to attending lectures

• students are encouraged to generate their own notes according to their learning styles

• doctor's notes are required for deferred midterm exam (final exam is scheduled by Registrar's Office, please inform the office if any arrangements was to be made)

• classroom communications will be posted on the "announcement" section in Moodle and emails will be sent to the Ambrose account, please check your Ambrose email periodically

Attendance:

• "on time" lab attendance is mandatory - student, who missed more than 2 lab sessions, would automatically fail the course

• attendance is required to obtain marks for in-tutorial assignments

Evaluation Methods:

Evaluation Methods	Due Date	Weighting
Student-led Lecture	Feb. 25th, 27th, and Mar. 3rd	5%
Mastering Biology Assignments	multiple	15%
Lab Report	▪ draft copy of "Introduction" due on **Feb. 4th** (2 of 10%) ▪ final report is due on **Apr. 10th**	15%
Lab Exam	Apr. 7th	5%
Midterm Exam	Feb. 13th	25%
Final Exam (cumulative)		35%
Total		100%

Mastering Biology Assignments:

• pre-lecture reading and post-lecture assignments

• the deadline of assignments is agreed between students and the instructor, and will be announced in the "Announcement" section of Moodle and email will be sent via the announcement in Moodle to student's Ambrose email account

• NO deferred assignment due to absence (unless pre-arrangement was made or evidence of legitimate excuses was presented)

Lab Project and Report:

• work in a group of pair

• free sign up for Benchling at https://www.benchling.com/academic/

Midterm Exam: (30%)

• focus on understanding the biological concepts rather than detail memorization

• NO make-up or deferred exam unless evidence of legitimate excuse, such as doctor's notes, is presented

Final Exam: (35%)

• final exam is *comprehensive (i.e. cumulative)*

Grade Summary:

Percent (%) to Letter Grade Conversion	Grade	Grade Point	Description
92.00% - 100%	A+	4.0	Excellent
85.00% - 91.99%	A	4.0	
80.00% - 84.99%	A-	3.7	
77.00% - 79.99%	B+	3.3	Good
73.00% - 76.99%	B	3.0	
70.00% - 72.99%	B-	2.7	
67.00% - 69.99%	C+	2.3	Satisfactory
63.00% - 66.99%	C	2.0	
60.00% - 62.99%	C-	1.7	
55.00% - 59.99%	D+	1.3	
50.00% - 54.99%	D	1.0	Minimal Pass
00.00% - 49.99%	F	0	Fail

Because of the nature of the Alpha 4.00 system, there can be no uniform University-wide conversion scale. The relationship between raw scores (e.g. percentages) and the resultant letter grade will depend on the nature of the course and the instructor's assessment of the level of each class, compared to similar classes taught previously.

Please note that final grades will be available on student registration system. Printed grade sheets are not mailed out.

Other:

Classroom Etiquette:

Electronic Devices

Although computers and tablets can be used in the class for taking lecture notes, cell phone usage is not permitted. Please turn cellular phones off - it is very distracting to hear someone's phone go off in class. Texting and movie watching are prohibited in class.

Attend every class

You will find that students who attend every class, listen to the instructor and take good notes will be more likely to pass (with a higher grade). If you have an emergency or illness, please contact me ahead of time to let me know that you will be absent.

Important note: if you miss a class it is your responsibility to meet with the instructor, outside of regular class time, to determine a plan to make up the missed work.

Get to Class On Time

Students, who walk into the classroom late or leave early, distract other students and disrupt the learning environment.

Do Not Have Private Conversations

The noise is distracting to other students. Also, talking to classmates during lecture and presentations disrupts the normal learning environment.

Do Not Get Up and Walk Out Halfway Through the Class

It disturbs people and gives the unmistakable impression that you don't respect the class, the other students or the instructor. The instructor has the right to finish his or her thought at the end of the class period and conclude the class in an orderly fashion without people standing up and walking out

Your Classmates Deserve Your Respect and Support

Others may have different ideas and opinions from yours, they may ask questions you perceive to be "stupid," but they deserve the same level of respect from you as you wish from them.

Plagiarism:

Plagiarism is a very serious academic offence that involves presenting work in a course as if it were the result of one's own study and investigation when, in fact, it is the work of someone else. Plagiarism takes place when:

- an essay or other work is copied from another source, including your peer's work, and submitted as one's own
- parts of a work, including words, ideas, images or data, are taken from a source without acknowledgement of the originator
- work presented for one course is also submitted for another course without prior agreement of the instructors involved
- another person prepares the work that is submitted as one's own
- substantial editorial or compositional assistance from another person is received on work that is submitted as one's own

Cheating:

Cheating is also a very serious academic offence. Cheating on examinations, assignments and/or labs may take a number of forms, including:

- tampering or attempting to tamper with examination scripts, class work, grades or class records
- obtaining unauthorized assistance from anyone during the course of an examination
- impersonating another student during examinations
- falsifying or fabricating lab reports
- communicating with other students during an examination
- bringing unauthorized written material or electronic devices to an examination
- possessing, distributing, or attempting to possess or distribute unauthorized material in respect to examinations
- attempting to read the examination papers of other students
- deliberately exposing one's own examination papers to another student

Ambrose University Academic Policies:

Communication
All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (cancelled class sessions, extensions, requested appointments, etc.) between class sessions. If students do not wish to use their Ambrose accounts, they will need to forward all messages from the Ambrose account to another personal account.

Registration
During the **Registration Revision Period** students may enter a course without permission, change the designation of any class from credit to audit and /or voluntary withdraw from a course without financial or academic penalty or record. Courses should be added or dropped on the student portal by the deadline date; please consult the List of Important Dates. After that date, the original status remains and the student is responsible for related fees.
Students intending to withdraw from a course after the Registration Revision Period must apply to the Office of the Registrar by submitting a "Request to Withdraw from a Course" form or by sending an email to the Registrar's Office by the **Withdrawal Deadline;** please consult the List of Important Dates on the my.ambrose.edu website. Students will not receive a tuition refund for courses from which they withdraw after the Registration Revision period. A grade of "W" will appear on their transcript.

Students wishing to withdraw from a course, but who fail to do so by the applicable date, will receive the grade earned in accordance with the course syllabus. A student obliged to withdraw from a course after the Withdrawal Deadline because of health or other reasons may apply to the Registrar for special consideration.

Exam Scheduling
Students, who find a conflict in their exam schedule must submit a Revised Examination Request form to the Registrar's Office by the deadline date; please consult the List of Important Dates. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) the student has three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

Electronic Etiquette
Students are expected to treat their instructor, guest speakers, and fellow students with respect. It is disruptive to the learning goals of a course or seminar and disrespectful to fellow students and the instructor to use electronics for purposes unrelated to the course during a class session. Turn off all cell phones and other electronic devices during class. Laptops should be used for class-related purposes only. Do not use iPods, MP3 players, or headphones. Do not text, read, or send personal emails, go on Facebook or other social networks, search the internet, or play computer games during class. Some professors will not allow the use of any electronic devises in class. The professor has the right to disallow the student to use a laptop in future lectures and/or to ask a student to withdraw from the session if s/he does not comply with this policy. Repeat offenders will be directed to the Dean. If you are expecting communication due to an emergency, please speak with the professor before the class begins.

Academic Policies
It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. Personal information (information about an individual that may be used to identify that individual) may be required as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Extensions
Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a course Extension from the Registrar's Office. Requests for course extensions or alternative examination time must be submitted to the Registrar's Office by the deadline date; please consult the List of Important Dates. Course extensions are only granted for serious issues that arise "due to circumstances beyond the student's control."

Appeal of Grade
An appeal for change of grade on any course work must be made to the course instructor within one week of receiving notification of the grade. An appeal for change of final grade must be submitted to the Registrar's Office in writing and providing the basis for appeal within 30 days of receiving notification of the final grade, providing the basis for appeal. A review fee of $50.00 must accompany the appeal. If the appeal is sustained, the fee will be refunded.

Academic Integrity
We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to acknowledge to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.

Note: Students are strongly advised to retain this syllabus for their records.