Lectures
Tuesdays/Thursdays 10:20-11:35 PM
Foster Hall 145

Instructor
Dr. Michele Nishiguchi
Office: 212 Foster Hall
Phone: 646-3721
e-mail: through the Canvas Biol 478 site (see URL below). Just click on the Email option, then compose a message-you can use the “browse” button next to the “Send To” line to find my name and select it. This mail is completely contained within the Canvas website, so please check there for replies to your messages (i.e. messages will not get sent to your NMSU or other e-mail account).

Postdoctoral Co-Instructor
Alba Chavez
albitach@nmsu.edu

Graduate Teaching Assistant
Neda Nourabadi
nedan@nmsu.edu

Office Hours
• Wednesdays 4:00-5:00 PM
• By appointment (call or e-mail me to set up a meeting)

Texts
*Molecular Genetics of Bacteria, 4th Edition*, Snyder, Peters, Henkin, and Champness, 2013, ASM Press. Optional reading, from books on reserve and in the library will be available in most instances to complement lecture material.
Additional Texts for reference

Prescott’s Microbiology, 9th edition, Willey 2013, McGraw Hill

Journal articles that complement the material in class will also be assigned throughout the course (will announce these in class), and will be available online.

Why Microbial Genetics?
This course is a requirement for Microbiology majors, and is recommended for Genetics, Biochemistry, and Biology majors who want to increase their knowledge in genetics, microbiology, and genetic techniques. Topics range from the basics of DNA copy, transfer, and editing, to more advanced topics on recombination and mutagenesis. Dr. Nishiguchi is a microbial ecologist who uses many of the basic theories in microbial genetics to better understand how beneficial microbes help multicellular organisms. She has an avid interest in conveying this information to students who are interested in microbes as well as their importance in the environment.

Course Website
The course website will be maintained through Canvas, which can be accessed at http://learn.nmsu.edu
You need an NMSU Global LoginID and Password to access your individual “My Canvas”, which is where you will find the link to our BIOL 478 site. If you do not already have an NMSU Global LoginID and password, you can obtain one online at http://learn.nmsu.edu (there is a link to click Create Your ID). Once you have your login ID and password, you can access the course website. PLEASE obtain your ID and password IMMEDIATELY (and remember what they are!), so that you can contact me via the Blackboard course mail, as well as access lecture outlines, exam keys, additional review questions, quizzes and your scores on exams and quizzes.
Course Objectives
At the end of this course, you will be able to:
1) Identify how DNA and RNA influence inheritance as well as their role in the transfer of genetic information to the cellular level;
2) Recognize how recombination influences mutational changes in bacteria;
3) Understand the underlying mechanisms of microbial gene expression on a global scale (multiple signaling pathways, regulatory mechanisms from environmental influences).

The course is divided into 3 modules:
Part I- DNA/RNA basics: Replication, transcription, translation, mutation and inheritance, DNA transfer (transformation, conjugation, plasmids). **Shaded blue in the syllabus.**

Part II- How do they do it?: Viruses, transposition, site specific recombination, homologous recombination. **Shaded green in the syllabus.**

Part III- Mission Control: DNA repair and mutagenesis, gene expression, global regulation. **Shaded yellow in the syllabus.**

I will focus on specific learning objectives and outcomes at the beginning of each module, as well as each class lecture.

Evaluation
Exams: There will be three in class exams (two midterms and a final), each worth 100 points (3 x 100 for a total of 300). No make up exams will be given without a reasonable excuse (as judged by the instructor and preferably in advance). If you have an excused absence, I will take the average of the two exams, and this will be your grade for the missed exam. All other unexcused absences will receive a zero. Students must earn at least a “C” grade to get an “S” in the S/U option.

Case Studies
There will be 2 case studies presented in class, and students will be assigned into groups of 3-4 persons/group. Each group must work together to complete the assignment, and then turn in separate reports for each
assignment. Each exercise will be given one week in advance before it is due. Case studies are worth 50 points each (2 x 50 = 100 points total).

Oral Presentations
An oral presentation from the second case study will include a group presentation of the results, and possible explanations of the problem, and how the results were interpreted. Class participation is encouraged (questions asked to each of the presenting groups). Students from each group must work together to present a clear and concise overview of their study. This portion is worth 50 points.

Class Participation
Students are encouraged to participate in class group study/workshop exercises of the topics throughout lecture. These worksheets are worth 5 points each (10 will be given out during the semester, total of 50 points). Group participation and evaluation of the 2nd case study (oral presentation) will also be expected, and is worth 20 points. If you do not participate, you will not receive any of these points. There will be 6 pop quizzes throughout the semester (worth 5 points each, total of 30 points). Some extra credit will be offered throughout the semester as well, but will not be counted as part of the possible points for the course. A total of 100 points is assigned for this portion of the course (50 + 20 + 30 = 100).

Grading
There are 550 possible points for the course. They are broken down as follows:

- 300 points will be based on the exams (3 @ 100 points each)
- 100 points will be based on the written case studies (2 @ 50 pts/ea)
- 50 points will be based on the 2nd case study oral presentation
- 20 points will be based on class participation for case study 2
- 50 points will be based on worksheets given in class (10 @ 5 pts/ea)
- 30 points will be based on in class quizzes (6 @ 5pts/ea)

Grading Scale
Your grade will be based on the number of points (out of the 550 possible) that you earn. The grading scale is as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points (out of 550 possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>450+</td>
</tr>
<tr>
<td>B</td>
<td>400-449</td>
</tr>
<tr>
<td>C</td>
<td>350-399</td>
</tr>
<tr>
<td>D</td>
<td>300-349</td>
</tr>
<tr>
<td>F</td>
<td>0-299</td>
</tr>
</tbody>
</table>
A $\geq 495$
B $440-494.9$
C $385-439.9$
D $330-384.9$
F Less than 329.9

Exam Policies
You are reminded to review the Student Code of Conduct (http://www.nmsu.edu/%7Evpsa/handbook.html). In particular, please consult section III. B and III. C of the Student Code of Conduct. Please also see the section on Academic Honesty below. Students who are found to be cheating/plagiarizing on an exam will receive a minimum of an automatic zero for that exam (as a first offence) and the Instructor reserves the right to consider more severe penalties, especially for repeat incidences. Such penalties include automatic failure (i.e. an automatic grade of F) of the course, and referral to the course Dean and Student Judicial Affairs. Please do not risk your GPA and your academic career over an exam in this course, it is not worth it!!

Official University Business and Missed Exams
Students who must miss an exam to participate in an official University function are asked to bring the documentation to Dr. Nish at least two weeks in advance and make the necessary arrangements (i.e. before your departure).

Coursework: You MUST turn in all work for the course. If an emergency results in your missing any required proposal/paper, you must contact Dr. Nish with written documentation immediately (for example physician documentation of serious illness), and Dr. Nish must be able to verify the information. If you are making passing progress (i.e. an overall grade of C or better in the course) prior to the emergency, then you will be assigned an Incomplete (I). You will have to sign an I Grade Information Form stating that you will make-up the coursework with Dr. Nish in order to complete the course, and that failure to complete the make-up the work within one year will result in the assignment of a replacement grade (i.e. to replace the I) based on the zero for the missed assignment. If you are not making passing progress (i.e. do not have an overall grade of C or better in the course) then you are not eligible for an Incomplete and will receive a zero for the missed
assignment, and this score will be used to calculate your final course grade. Complete information regarding I grades can be found in the Undergraduate Catalogue (in the Regulations section). Please note that the final exam date and time was set last fall by the university (before registration for the spring semester), and that travel plans, for example to return home, vacation or start seasonal employment do NOT constitute unanticipated or unavoidable emergencies. Please schedule (or re-schedule) any travel plans so that you are here to turn in assignments as scheduled by the university.

**Academic Honesty**

All students are required to maintain the highest standards of academic honesty and conduct—these are the same high standards that will be expected of you in your future academic and professional careers. The student code of conduct outlines many of these expectations, and may be found at (http://www.nmsu.edu/~vpsa/SCOC/misconduct.html). Cheating and academic misconduct in any form will NOT be tolerated (see the penalties described in the Exam Policies section above and noted at the end of this section). The student code of conduct outlines various forms of academic misconduct in section III.B. Cheating includes, but is not limited to possession and/or use of unauthorized materials during exams; copying the work of another (e.g. another student, instructor or other reference source); using the words or ideas of another (e.g. another student, instructor or other reference source), especially without proper acknowledgement and citation (but keep in mind that citing a source DOES NOT allow you to use their words and/or organization and/or structure if these are copied directly or substantially copied); providing another student the opportunity to copy your work on exams or assignment, looking at the work of another student during exams and quizzes and providing another student the opportunity to earn participation points when they are not in class to earn them themselves (in which case both/all students involved will be considered to have engaged in academic dishonesty, and both/all will, at a minimum, lose all 100 participation/quizzes/in class worksheet points).

An additional note about plagiarism:

Be aware of plagiarism. Not only must you credit your source(s) for any ideas that are not your own, but you MUST paraphrase in YOUR OWN WORDS. Changing the occasional word in a sentence does not constitute expression of the idea in your own words (i.e. if you submit an assignment in which you have
merely changed a few words from a source, &/or have retained the
structure and organization of your source, then you have submitted a
plagiarized assignment, even if you have cited that source). Again, two key
points are (i) to cite your sources (for ideas) and (ii) to paraphrase or
summarize in your own words. This is particularly important in the sciences,
as we do not typically rely on "quotations". If you are unsure of anything in
this regard, please come and talk to me about any concerns. You may also
find some of the following websites helpful, and I encourage you to consult
them for guidelines and examples dealing with this issue:
http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml
http://www.indiana.edu/~istd/overview.html
http://lib.nmsu.edu/instruction/libterms.htm#P (a definition of plagiarism
from the NMSU Library website). Note that this definition addresses both
intentional and unintentional acts of plagiarism. Neither are acceptable.
http://lib.nmsu.edu/instruction/plagiarismforstudents.htm
Any act of plagiarism will result in a MINIMUM of a zero for ALL class
assignments (i.e. a loss of all the possible assignment points), and more
severe penalties (including but not limited to automatic failure of the course
and referral to the course Dean and Student Judicial Affairs) may be
considered.

Disabilities and Accommodations
If you have (or believe you have) a disability and would benefit from
classroom accommodation(s), please contact the Services for Students with
Disabilities (SSD) Office located at Garcia Annex [Phone: 646-6840; TTY:
646-1918].

If you have a condition that may affect your ability to exit safely from the
premises in an emergency or that may cause an emergency during class, you
are encouraged to discuss any concerns with the Instructor.

Section 504 of the Rehabilitation Act of 1973 and the Americans with
Disabilities Act (ADA) covers issues relating to disability and
accommodations. If a student has questions or needs an accommodation in
the classroom (all medical information is treated confidentially), contact:

Trudy Luken
Student Accessibility Services (SAS) - Corbett Center, Rm. 244
NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status. Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation.

For more information on discrimination issues, Title IX or NMSU’s complaint process contact:

Gerard Nevarez or Agustin Diaz  
Office of Institutional Equity (OIE) - O’Loughlin House  
Phone: 646.3635 E-mail: equity@nmsu.edu  
Website: [http://www.nmsu.edu/~eeo/](http://www.nmsu.edu/~eeo/)

**Student Responsibilities**
1. Register with SSD and obtain accommodation documents early in the semester;
2. Deliver the completed accommodation and testing form(s) to the instructor(s) within the first two weeks of beginning of classes (or within one week of the date services are to commence);
3. Retrieve the signed form(s) from faculty and return to SSD within five (5) days of receipt from faculty and at least one week before any scheduled exam; and,
4. Contact the SSD Office if the services/accommodations requested are not being provided, not meeting your needs, or if additional accommodations are needed. Do not wait until you receive a failing grade. Retroactive accommodations cannot be considered.

**Faculty Responsibilities**
1. Sign the ACCOMMODATION REQUEST FORM and TESTING ACCOMMODATION FORM (when presented), retain a copy, and return a copy to the student within five (5) working days of receipt;
2. Contact SSD immediately if there are any questions or disputes regarding accommodation(s), disruptive behavior, etc.; and,
3. Refer the student to SSD for any additional accommodations.

Accommodations: SSD Office, 646-6840 (Garcia Annex, Rm 102) Michael Armendariz
Discrimination: EEO/ADA & Employee Relations, 646-3333 (Hadley Hall, 15) Elva Telles.
All medical information will be treated confidentially.

Dropping the Course
Your instructor will not automatically drop students for poor performance or attendance. It is your responsibility to do so (by completing the necessary paperwork) prior to the Friday, September 7th deadline to drop the course w/o showing up on your transcript, or by Tuesday, October 16th deadline to drop with a "W". Last day to withdraw from the university is Friday, November 16th.

Attendance
Formal attendance will not be taken during lectures. However, it is strongly recommended that you attend and participate in all lectures, as this is your opportunity to both earn class participation points and to get the most out of the class. Note also the University expectation regarding attendance, found in the current Undergraduate Catalog: "Students are expected to attend regularly all classes for which they are registered". You are responsible for all the material (including announcements of schedule or other syllabus changes, including any announcements regarding extra credit opportunities, should any be available) presented in lecture and the reading assignments. If you do miss a lecture, please be sure to obtain lecture notes from another student, review the reading assignment and then, once you have completed this review process, contact me if you have any remaining questions.

Consideration
Please be considerate of your classmates and the general environment while in the lecture room. This includes turning off (or using a silent mode) cell phones and pagers. Dogs (with the exception of aide dogs), bikes and roller blades are not allowed in the lecture room, for safety considerations. Please keep in mind that conversations with classmates (even whispered ones) can interfere with the ability of others to hear and follow the lecture. If you
have a question during the lecture, please feel free to ask me (and chances are that many of your fellow classmates will also appreciate the clarification). If you know you need to leave early, please try to select a seat near an exit.

**Study Strategy**

This course covers a great deal of material. You are responsible for the lecture material as well the reading assignments. It is not always possible for your instructor to cover every topic in great depth, thus you will need to keep up with the reading assignments. Use the lectures as a guide for your reading, and use the text to help you understand the material that we cover together in lecture. Often the figures in the text are helpful in this regard, as they summarize a great deal of information.

It is highly recommended that you review your lecture notes as soon after each lecture as possible. Use this time to supplement your lecture notes with additional helpful information from the reading assignment. To be sure that you understand the material, complete the additional review questions posted on the course website. Form study groups (help each other learn). Draw your own diagrams or flow charts, make your own tables etc. Come to office hours to ask any questions and clarify any information. I am happy to help!

**Grading Errors**

It is your responsibility to check your exam and assignment scores as they are posted on the course website. If you have a question about your exam or quiz grading, please let Dr. Nish know within one week of the posting of the relevant score so that any questions can be promptly resolved. After one week, there is no guarantee that any action can be taken.

**Disclaimer**

The instructor reserves the right to modify the course schedule or other aspects of the syllabus during the semester as considered necessary to achieve course objectives. Any necessary changes to the syllabus (or to the course schedule) will be announced in class and you are responsible for being aware of them.
# Molecular Biology of Microorganisms Tentative Lecture Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurs 8/22</td>
<td>Intro to the Course</td>
<td>Introduction</td>
</tr>
<tr>
<td>Tues 8/27</td>
<td>Replication and Segregation</td>
<td>Ch. 1</td>
</tr>
<tr>
<td>Thurs 8/29</td>
<td>Replication and Segregation <strong>Deadline for Reg/Course Addition (8/30)</strong></td>
<td>Ch. 1</td>
</tr>
<tr>
<td>Tues 9/3</td>
<td>Bacterial Gene Expression-Transcription (Dr. Chavez)</td>
<td>Ch. 2</td>
</tr>
<tr>
<td>Thurs 9/5</td>
<td>Bacterial Gene Expression-Translation and protein folding (Dr. Chavez)</td>
<td>Ch. 2</td>
</tr>
<tr>
<td>Tues 9/10</td>
<td>Genetic Analysis-Inheritance and Mutations <strong>Case Study I</strong> (Dr. Chavez)</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>Thurs 9/12</td>
<td>Plasmids (Dr. Chavez)</td>
<td>Ch. 4</td>
</tr>
<tr>
<td>Tues 9/17</td>
<td>Conjugation</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>Thurs 9/19</td>
<td>Conjugation</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>Tues 9/24</td>
<td>Transformation- <strong>Case Study I due in class</strong></td>
<td>Ch. 6</td>
</tr>
<tr>
<td>Thurs 9/26</td>
<td><strong>MIDTERM I</strong></td>
<td>Chpts 1-6</td>
</tr>
<tr>
<td>Tues 10/1</td>
<td>Lytic Bacteriophages</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>Thurs 10/3</td>
<td>Lysogeny</td>
<td>Ch. 8</td>
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<tr>
<td>Tues 10/8</td>
<td>Transposition</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>Thurs 10/10</td>
<td>Site specific recombination</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>Tues 10/15</td>
<td>Homologous recombination <strong>Last Day to Drop with a “W”</strong></td>
<td>Ch. 10</td>
</tr>
<tr>
<td>Thurs 10/17</td>
<td>Homologous recombination</td>
<td>Ch. 10</td>
</tr>
<tr>
<td>Tues 10/22</td>
<td>DNA repair and mutagenesis (Dr. Chavez)</td>
<td>Ch. 11</td>
</tr>
<tr>
<td>Thurs 10/24</td>
<td><strong>MIDTERM II</strong></td>
<td>Chpts. 7-10</td>
</tr>
<tr>
<td>Tues 10/29</td>
<td>DNA repair and mutagenesis <strong>Case Study II</strong> (Dr. Chavez)</td>
<td>Ch. 11</td>
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<tr>
<td>Thurs 10/31</td>
<td>Gene Expression-regulation (Dr. Chavez)</td>
<td>Ch. 12</td>
</tr>
<tr>
<td>Tues 11/5</td>
<td>Gene Expression-regulation (Dr. Chavez)</td>
<td>Ch. 12</td>
</tr>
<tr>
<td>Thurs 11/7</td>
<td>Global regulation</td>
<td>Ch. 13</td>
</tr>
<tr>
<td>Tues 11/12</td>
<td>Global regulation <strong>Case Study II due in class</strong></td>
<td>Ch. 13</td>
</tr>
<tr>
<td>Thurs 11/14</td>
<td>Case Study Presentations; <strong>Last day to withdraw from the univ. (11/11)</strong></td>
<td>Chtpts 14</td>
</tr>
<tr>
<td>Tues 11/19</td>
<td>Case Study Presentations</td>
<td></td>
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<tr>
<td>Thurs 11/21</td>
<td>Case Study Presentations</td>
<td></td>
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<tr>
<td>Tues 11/26</td>
<td>No class- Thanksgiving Break</td>
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<tr>
<td>Thurs 11/28</td>
<td>No class- Thanksgiving Break</td>
<td></td>
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<tr>
<td>Tues 12/3</td>
<td>Cell Biology and Development (Dr. Chavez)</td>
<td>Ch. 14</td>
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<tr>
<td>Thurs 12/5</td>
<td>Cell Biology and Development (Dr. Chavez)</td>
<td>Ch. 14</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Reading</td>
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<tr>
<td>Thurs 12/12</td>
<td><strong>FINAL EXAM, 10:30-12:30 PM</strong></td>
<td>Chpts. 11-14</td>
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