COURSE: BIOL 371 – Genetics (3 credits)

ACADEMIC TERM: Spring 2010

MEETINGS: MWF 2 – 2:50 pm C304

INSTRUCTOR: Dr. Rajesh K. Sani, Assistant Professor
Office Hour: Afternoon open door or by appointment, McLaury Rm 103
Phone: 605-394-1240, e-mail: rajesh.sani@sdsmt.edu

COURSE DESCRIPTION:
This course is designed to provide a basic knowledge on nearly all of the fundamental concepts of genetics including the principles governing the nature, transmission, and function of hereditary material with application to plants, animals, and microorganisms. The course will focus on the basic principles of Mendelian genetics and deal with the modern discoveries of molecular biology and their applications in today's world. The knowledge will directly be applicable to science and engineering related fields. Up-to-date techniques in genetic engineering and bioinformatics will be introduced for the understanding of biological problems.

COURSE PREREQUISITES: BIOL 151 and 153 or consent of instructor

DESCRIPTION OF INSTRUCTIONAL METHODS:
The course comprises of lectures, discussions, and will include active, collaborative, and problem-based learning techniques (e.g., one minute paper, brainstorm applications of class material, summarize/clarify lecture notes generation of test questions or homework problems from lecture material). Lecture outlines and supplementary materials will be posted at the course website (https://d2l.sdbor.edu/). Students should read relevant material in the textbook and outlines prior to attending class. Questions about recent lectures will be asked during class. Students are required to participate in answering questions.

COURSE REQUIREMENTS:
Required Text: Genetics: Analysis and Principles
   ISBN: 0072992786
   Available at Tech Bookstore


Additional Materials:
3. Search for up-to-date information on lecture topics from the web pages is recommended

Attendance: To achieve success in this course, regular attendance is strongly recommended.

Academic dishonesty: All students are expected to be familiar with the student code of conduct. Regulations regarding academic integrity are described in Board of Regents Policy 3-4 (http://www.sdbor.edu/policy/policy.htm). Acts of dishonesty in class activities include cheating in
exams, quizzes, and homework problems. Appropriate penalties may include retaking the examination, reduction of grade, or discharge from class.

Make-up Policy: Students are required to take exams at the scheduled time. Make-up exams can be arranged for students participating in institution-sponsored activities. In this case, the exam should be taken prior to the scheduled time, and arrangements to take the exam should be made one week prior to scheduled exam.

COURSE GOALS:
- To introduce the principles of biological mechanisms to scientists/engineers
- To recognize current trends in molecular biology and biotechnology in response to current demands from various sectors of industry,
- To understand the concepts of bioinformatics and its application in science and engineering fields,
- To introduce computer techniques in molecular biology: Overview of NCBI and other databases, sequence alignment and blast, and constructing phylogenetic trees, and
- To acquire the skills in computational analysis of biological data.

Department Programmatic Objective Met:
- Apply a fundamental knowledge, and practical understanding, of engineering principles (ABET – a,c,k).
- Incorporate technical and non-technical issues in problem solving (ABET - e).

OUTCOMES:
After completion of this course, students will be able to:
- Describe principles of molecular biology and powerful biological techniques including genetic engineering, bioinformatics
- Use computer software to analyze DNA information, and
- Recognize the importance of molecular genetic information in science and engineering areas

EVALUATION PROCEDURES:
Exams, homeworks, and quizzes are planned. No excuses for missed exams/quiz will be accepted other than prearrangements or certified medical excuses. The approximate contribution to the term grade is as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Homework*</td>
<td>150</td>
</tr>
<tr>
<td>Quizzes</td>
<td>50</td>
</tr>
<tr>
<td>Two Exams**</td>
<td>200</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
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</table>

*Homework is due in class. Use plain paper, put your name at the top right corner of the first page and staple it at the top left corner (Do not fold). Late homework will not be accepted unless it is arranged with me in advance.

**See details below under “TENTATIVE SCHEDULE”

Grading
A ≥90%
B ≥80%
C ≥70%
D ≥60%
F <60%
FREEDOM IN LEARNING:
Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should contact the dean of the college which offers the class to initiate a review of the evaluation.

ACADEMIC INTEGRITY:
All students are expected to read and follow the policy governing academic integrity section in the SDSM&T catalog that explains the importance of academic honesty and intellectual integrity (BOR Policy 3.4.2.B.1). Acts of dishonesty include cheating in exams and assignment problems and fraud or plagiarism in reports and review papers. Appropriate penalty such as retaking the exam, reduction of grade, or discharge from the class may be given to the individual who violates.

CAMPUS AMERICANS WITH DISABILITY ACT (ADA) POLICY:
Students with special needs or requiring special accommodations should contact the instructor, Dr. Sani, at 394-1240 and/or the campus ADA coordinator, Ms. Jolie McCoy, at 394-1924 at the earliest opportunity.

TENTATIVE SCHEDULE:
Note: Topics indicated below are for guide purpose only. They may take longer or less time to cover.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 15</td>
<td>Overview of genetics</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>2 – 5</td>
<td>Jan 20 to Feb 12</td>
<td>Patterns of inheritance</td>
<td>Chapters 2 to 6</td>
</tr>
<tr>
<td>Exam 1</td>
<td>Feb 17</td>
<td>Chapters 1 to 6</td>
<td>Chapters 2 to 6</td>
</tr>
<tr>
<td>6 – 12</td>
<td>Feb 19 to Apr 2</td>
<td>Molecular structure and replication of genetic material, Molecular properties of genes</td>
<td>Chapters 9 to 14, 16</td>
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<tr>
<td>Exam 2</td>
<td>Apr 5</td>
<td>Chapters 9 to 14, 16</td>
<td>Chapters 9 to 14, 16</td>
</tr>
<tr>
<td>13 – 16</td>
<td>Apr 7 to Apr 30</td>
<td>Genetic technologies</td>
<td>Chapters 18 to 21</td>
</tr>
<tr>
<td>17</td>
<td>May 7 (9-9:50 AM)*</td>
<td>FINAL EXAM [Chapters 1 to 16 - 30%, and Chapters 18 to 21 - 70%]</td>
<td>GOOD LUCK!</td>
</tr>
</tbody>
</table>

*http://sdmines.sdsmt.edu/cgi-bin/global/a_bus_card.cgi?SiteID=421244


Finally: Suggestions for improvements to class format, teaching style, or content are highly welcomed!