1. Objectives

- Describe and compare the humoral and cellular immune responses including how they are triggered in response to bacterial, viral and tumor antigens, and how they mature and evolve such that effector cells are generated and immune memory is established.
- Explain the regulation of the immune system, the role of antibodies and cytokines, as well as the role of effector T cells in the immune response.
- Discuss hypersensitivity reactions.
- Recall specific autoimmune disorders and their characteristics.
- Discuss the basis for transplant rejection.
- Recall specific congenital immunodeficiency disorders and their characteristic clinical presentations.
- Describe several approaches to tumor immunotherapy.
- Recall different types of vaccines.
- Interpret specific immunologic assays.

2. Core Content

This course is designed to introduce medical students to both the basic concepts of immunology and the clinical applications of the field today. The first two weeks of the course outline the elements and principles of the innate immune system and the maturation of adaptive immunity, via T and B lymphocytes. The second half of the course will expose the student to clinical manifestations of disruptions in immune function.

3. Teaching Methods

The material is presented in a lecture-based format with the majority of the material reflective of the content presented in The Immune System, 3rd edition by Peter Parham. Several clinical case presentations are also offered by volunteer physicians and/or researchers, attendance at these sessions are mandatory.
4. Evaluation Methods

Two exams are given during the course. At the time of the exam students are provided with a critique sheet to state their concerns on specific questions. These critique sheets will be handed in with the exam. Student critiques along with the statistical item analysis will be used to determine if a particular question should be “thrown out” or other answers accepted. In addition 5 optional quizzes consisting of 10 questions each are given throughout the duration of the course. The quizzes are designed to help the students assess their ability to keep up with the pace of the course without penalty. The quiz score can help to improve the student’s final grade but will not negatively impact their final grade.

5. Grading Structure

Each exam will count 100 points each and averaged together for the “Final Score”. Each of the 5 quizzes, which are worth 20 points, will cumulatively be worth a total of 100 points and will represent the “Quiz Score”. If the Quiz Score is greater than the Final Score, the Quiz Score is averaged in with the two exam scores to become the “Adjusted Final Score”; in this scenario the Quiz Score then functions as a third exam. If the Quiz Score is lower, the Quiz Score will be ignored and the Final Score is based solely on the two exam scores. Letter grades are assigned as follows:

<table>
<thead>
<tr>
<th>LETTER GRADE</th>
<th>OVERALL AVERAGE</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>90.0 or higher</td>
</tr>
<tr>
<td>B</td>
<td>80.0-89.9</td>
</tr>
<tr>
<td>C</td>
<td>70.0-79.9</td>
</tr>
<tr>
<td>F</td>
<td>Less than 70.0. Repetition of entire course is required.</td>
</tr>
</tbody>
</table>

6. Summary of Student Feedback

**MY OVERALL EVALUATION OF THIS COURSE IS:**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>74.19</td>
<td>62.5</td>
<td>77.8</td>
</tr>
<tr>
<td>Good</td>
<td>24.19</td>
<td>35.7</td>
<td>19.0</td>
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<tr>
<td>Satisfactory</td>
<td>1.61</td>
<td>1.8</td>
<td>3.2</td>
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<tr>
<td>Total:</td>
<td>100.0</td>
<td>100.0</td>
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**General Comments and Strengths – 2010 Survey**

Overall, the quality of instruction was good. I really liked how Dr. Clemons would incorporate previous material into each of her lectures.

The quality of instruction from both Dr. Clemons and the guest lecturers was excellent.

I felt everything was very clear and the teachers made every effort to make sure you actually learned the material.
Great instruction and format

It was great. Presented in a clear easy to follow format. Quizzes nice as they forced you to read and keep up.

I love immunology! I am so proud to know I have gone from knowing nothing to know so much about immunology. Dr. Clemons was a great teacher.

One of the major strengths was that the lectures started out as more of an overview and then became more detailed. I believe this aided in the learning process of this material.

Even though it was a very fast paced course, the material was made easy to digest because the notes were very succinct and orderly. Dr. Clemmons also provided us with some good study guides for the two tests and was very willing to answer questions and provide review sessions at our request.

The quizzes were a great way to keep the students caught up with the material. This made studying for exams much easier.

Course organization was excellent (notes, PowerPoint’s, quizzes, etc.), instructor was wonderful, frequent quizzes to encourage you to keep up with the course were helpful.

The clinical lectures

I liked the quizzes because they gave me a sense of how well I knew the material. The handouts were well organized and easy to study.

Course Weaknesses – Survey 2010

The major weakness was that some of the guest lecturers tried to go over way too much material in one hour. This caused many people to lose interest. To fix this, their material needs to be more focused.

Compression of quizzes and exams sometimes made keeping up difficult (not sure how to fix w/o lengthening course).

None

I thought that the quiz questions were often difficult to understand. They didn't seem to be as well-worded as the test questions.

There wasn’t many practice questions to know what to expect on quizzes and exams.

Wording of questions on quizzes, mainly, and exams was often confusing and hard to follow

I think that the fact that the class was so short might affect my long term retention of the information. Besides this, I think the class was of very high quality.

Sometimes I felt like the information was not in the most cohesive order. It was a little difficult to keep the “big picture” in mind sometimes. However, this could be due to the complexity of the subject and may not be avoidable.

It was too short.
The speakers made the class more complicated. It was hard to know from an 80 slide PowerPoint what the major points were.

I found little merit in some of the guest lectures.

I felt that this was a strongly taught course and cannot think of any weaknesses.

Guest Lecturers that were difficult to understand.

While the notes are thorough, there are too many abbreviations that require cross referencing. Try not to abbreviate as much.

Very fast.

7. Summary of Student Performance

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
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<tr>
<td># Students</td>
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<td>59</td>
<td>64</td>
<td>65</td>
</tr>
<tr>
<td>Average grade</td>
<td>93.4%</td>
<td>91.6%</td>
<td>92.7%</td>
<td>92%</td>
</tr>
</tbody>
</table>

8. Plans for Change

I am always looking for willing volunteers to give interesting and informative clinical case presentations related to the topics presented throughout the course. The basic course structure just seems to work, although there are always comments regarding lengthening the course I feel that the students are better served by being provided with the basic Immunology foundation prior to their exposure to Microbiology and Virology.