Objectives of the Course:

This course aims to help students integrate the biochemical, physiological and molecular knowledge on human health and disease and built the scientific background required for successful progression in the basic biosciences and medical sciences.

The main objectives of this course are to:

- Guide students to acquire, integrate and apply the basic science principles that underlie the biochemical, molecular biology and physiology theory and practice.
- Provide students with knowledge, skills and opportunities to identify, analyze and predict the molecular basis for the cause, effect of diseases.
- Develop students’ awareness of the advances in –omics research and the contributions of such research to study cell and tissue functions, and to treat diseases.
- Encourage individual and interactive life-long learning skills.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Discuss and compare the mechanisms of DNA damage and repair in relation to cell death and the development of neoplasia.
2. Discuss the molecular basis for the pathogenesis in inflammatory diseases.
3. Demonstrate using specific examples the molecular and biochemical bases of gene and protein function in major human genetic disorders.
4. Identify the experimental approaches in –omics research and systems biology used in the conceptual understanding of molecular mechanisms and cell physiology and discuss the
implications of the human genome project in understanding human diseases.
5. Compare the molecular and biochemical bases of gene and protein function and report on the risk factors involved in the development of major human degenerative diseases.
6. Appraise how controlling gene and protein expression as well as signal transduction pathways aid in the design of therapeutic strategies.

Course Contents:

Mechanisms of Diseases
1. Molecular mechanisms of cell death
2. Acute and chronic inflammation.
3. Infection and host response.
4. Neoplasia
   Implications of Molecular Biology and Genetics for the Understanding of Human Diseases
5. Molecular Genetics: The Human Genome Project
6. The Human Transcriptome
7. The Human Epigenome
8. The Human Proteome
9. Integration of Systems Biology

Molecular Pathogenesis
10. The Biological basis of human diseases
11. Integration of molecular and cellular pathogenesis
13. Molecular basis of hemostatic and thrombolytic diseases
14. Molecular basis of diseases of immunity

Learning Activities and Teaching Methods:
Lectures; discussions sessions, presentations of medical research papers, independent study and review sessions

Assessment Methods:
Assignments, Tests and Mid-term Exam; Final Exam

Required Textbooks/Reading:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
<th>ISBN</th>
</tr>
</thead>
</table>
### Recommended Textbooks/Reading:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
<th>ISBN</th>
</tr>
</thead>
</table>