Course contents for Immunology

1. **Faculty:** FLSB
2. **Program & Semester:** M.Sc. Biotechnology Semester 2
3. **Course Title:** Immunology
4. **Number of Credits:** Three
5. **Course objectives:**

   Immune system essentially provides defense against microbial infections and spontaneously arising tumors. In this course, various immune defense mechanisms will be discussed with a focus on humans and mammals. Students would develop a perspective of how these mechanisms operate at molecular, cellular and organ levels and how this understanding may be used for evolving preventive and therapeutic strategies for a healthy life.

6. **Minimum prerequisites for taking this course, if any:**

   Basic knowledge of biochemistry, cell biology, genetics and molecular biology would be assumed.

7. **Course structure with units, if applicable:**

   1. An overview of the Immune System: Evolution of the immune system; cells and tissues of the immune system; cardinal features of the innate and adaptive immune system
   2. Innate Immunity: Innate sensing of the microbial world; innate memory; cross-talk between innate and adaptive immune system.
   3. Major histocompatibility complex and antigen presentation: Structure of MHC proteins; types of antigen presenting cells; biology of antigen presentation; MHC restriction
   4. B-cell biology: Development of B-cells, Types of B-cells; VDJ recombination, antibody structure; B-cell activation
   5. T-cell biology: Development of T-cells; Types of T-cells; T-cell activation; co-stimulation and its role in T-cell activation; T-cell regulatory mechanisms
   6. Immune effector mechanisms: CTL, NK-cells, T and B-cell crosstalk
   7. Complement system
   8. Concepts of immune tolerance and autoimmunity
   9. Hypersensitivity Reactions and Immune disorders
   10. Applied immunology: Vaccines, Immunological techniques

8. **Reading suggestions:**

   a. **Kuby Immunology** by Judith A. Owen and others
   b. **Basic Immunology: Functions and Disorders of the Immune** System by Abul K. Abbas and others
   c. **Cellular and Molecular Immunology** by Abul K. Abbas and others
   d. **Janeway's Immunobiology** by Kenneth Murphy
   e. **Trends in Immunology** (Journal)
   f. **Nature** (Immunology) journal

10. **Evaluation:**

Theory:	Mid-semester Written Examination	: 40% Marks
	End-semester Written Examination	: 40% Marks
	Quiz / Assignment/Presentation (oral / poster)/other	: 20% Marks