[A-3]COURSE SYLLABUS

1. Course Description (Approximately 100 words)

The aim of this course is to introduce methods and strategies commonly used in protein engineering. At the end of the course, students should be able to understand and explain differences between rational design and directed evolution, and have a general knowledge about miscellaneous topics such as searches in bioinformatics databases, isolation, expression or purification of novel proteins. Students will also get an overview of several biophysical techniques used for analysis of secondary, tertiary and quaternary structure, as well as of screening methods used for selection of novel protein variants with improved properties.

2. Course Goals and Objectives (Approximately 100 words)

At the end of this course, students are expected to be able to:

Describe rational and combinatorial methods of protein engineering.

Describe various methods for biochemical and biophysical characterization of proteins.

Critically analyze data and conclusions from the primary literature.

Formulate an original research plan for a specific protein engineering study and describe the advantages and limitations of the proposed research.

Converse at an advanced level about current key topics of investigation in the field of protein

3. Textbook (Title, Author, Publisher, Year of Publication, etc.)

Introduction to Proteins and Protein Engineering by Barry Robson (Author), Jean Garnier (Author)

Methods in Enzymology- Protein Engineering for Therapeutics, Parts A and B, eds. K. Dane Wittrup and Gregory L. Verdine, Elsevier, 2012.

4. Reference

Protein Engineering and Design 1st Edition by Sheldon J. Park (Editor), Jennifer R. Cochran (Editor)

5. Course Requirements and Grades

EXAMINATION = 70%
C.A.T. = 20%
ASSIGNMENTS = 10%

6. Course Calendar

Week	Main Content
1	Introduction to protein
2	Protein sequencing
3	Circular dichroism (CD) spectroscopy
4	MASS SPECTROMETRY
5	THE THREE-DIMENSIONAL STRUCTURE OF PROTEINS
6	Fibrous Proteins
7	C.A.T.
8	Tertiary Structure: Myoglobin and Hemoglobin
9	Forces that stabilize Protein Structure
10	PREDICTION OF THREE DIMENSIONAL STRUCTURES
11	PROTEIN TERTIARY STRUCTURES
12	Protein folding
13	NATURAL ENZYMES
14	EXAMINATION