SYLLABUS

1. Course title:

PHARMACEUTICAL BIOTECHNOLOGY

2. Code:

3. Cycle of study:

1

4. ECTS credits:

4

5. Type of course:

(●) Mandatory ( ) Elective

6. Prerequisites:

Knowledge of Basic Biochemistry

7. Class restrictions:

none

8. Duration / semester:

1 9

9. Weekly contact hours:

9.1. Lectures:	2
9.2. Seminars:	0
9.3. Laboratory/Practice classes:	1

10. Faculty:

Faculty of Pharmacy

11. Department/study program:

Pharmacy (integretd 1st and 2nd cycle)

12. Lecturer:

dr sc Selma Berbić, associate professor

13. Lecturer's e-mail:

selma.berbic@untz.ba

14. Web site:

www.pharmacy.untz.ba

15. Course aims:

Focus of the course is on the issues related to pharmaceutical profession with aim to provoke interest of pharmacy students for biotechnology. The aim is acquiring knowledge about design and production recombinant proteins, protein engineering, biotechnology-related technics, formulation protein therapeutics and pharmaceutical concerns these formulation, chemical modification of protein therapeutics, clinical use.

16. Learning outcomes:

It is expected that students accept and understand biophysical - chemical aspect of proteins, design and production of recombinant proteins, specially recombinant protein therapeutics, biophysical end biochemical analysis of recombinant proteins and formulations of protein therapeutics, which are important for practice and research in field of biotechnology and pharmaceutical profession.

17. Course content:

Protein engineering. Protein engineering- related technics. Production of recombinant proteins. Site-directed mutagenesis. Enzyme engineering. Antibody engineering. Fusion proteins. Techniques for characterizing protein folding and stability. Production of biotech compounds. Cultivation and downstream processing. Site specific delivery of protein drugs. Liposome. Immunoliposome. Biopharmaceuticales (formulations and pharmaceutical concerns). Insulin, Growth hormones, Erytropoietin, Interferons, Interleukins, Monoclonal antibody-based pharmaceuticals. Vaccines. Modern vaccine technologies. Gene Therapy. Gene transfer methods. Transgenic animals. Protein production in transgenic animals.

18. Learning methods:

Lectures, laboratory exercises (practicals), seminars (individual or group) and consultations.
Authorized lectures will be available for students in digital form.

19. Assessment methods:

Colloquial and written form exams for practical knowledge; final exam (written form) for theoretical knowledge; seminars (individual or group).
Final point score is formed in a cumulative way (sum of points from all forms of knowledge checking and student activity) with the point range 54-100 points.
If it is officially documented that a student cheated on the exam, the next exam term will be forbidden to them.

20. Assessment components:

Attendance and activity during lectures:	5 points (minimal 2 points)
Attendance during laboratory exercises (practicals):	5 points (minimal 2 points)
Colloquial :	30 points (minimal 18 points)
Activity during laboratory exercises (practicals)	3 points (minimal 2 points)
Test (lectures):	50 points (minimal 28 points)
Seminar (obligatory):	10 points (minimal 4 points)

21. Required reading list:

1. Daan J.A. Crommelin, Robert D. Sindelar. Pharmaceutical Biotechnology, Harwood Academic Publishers, 1977, 2008

22. Web sources:

23. Applicable starting from the academic year:

2012/13

24. Adopted in the Faculty/Academy session: