MODULE HANDBOOK

Module Name	Biochemical Research Techniques
Module level	Bachelor
Abbreviation, if applicable	4720102172
Sub-heading, if applicable	-
Course included in the module, if applicable	-
Semester/term	7th/Fourth Year
Module coordinator(s)	Prof. Dr. Rudiana Agustini, M.Pd ;
Lecturer(s)	Dr. Nuniek Herdyastuti, M.Si Dr. Prima Retno Wikandari, M.Si
Language	Indonesian
Classification within the curriculum	Elective Course
Teaching format/class hours per week during the semester:	2 hours lecturers (50 min per hours)
Workload:	1 CU for bachelor degree equals to 3 workhours per week or 170 minutes (50' face to face learning, 60' structured learning, and 60' independent learning). In one semester, courses are conducted in 14 weeks (excluding mid and end-term exam). Thus, 1 CU equals to 39.67 workhours per semester. One CU equals to 1.587 ECTS.
Credit points:	2 CU x 1.587 = 3.174 ECTS
Prerequisites course(s):	Structure and Function Biomolecule (Biochemistry I) and Metabolism and Pathways of Genetics Information (Biochemistry II)
Targeted learning outcomes:	**CLO 1** Students are able to make the right decisions in the context of solving problems in the field of chemistry. **CLO 2** Students are able to solve science, technology and art problems in the field of chemistry that are general and in simple terms and have the skills to isolate and identify enzymes, proteins and DNA from various sources as well as the application of relevant technologies. **CLO 3** Mastering the theoretical concepts of techniques or methods of isolation of enzymes, proteins and DNA from various sources, purification and characterization of proteins and DNA, PCR and Sequencing techniques as well as understanding the basic techniques of recombinant DNA and its application. **CLO 4** Demonstrates a responsible attitude towards work in his/her area of expertise independently.
Content:	**Protein properties and environmental effects on protein stability:** buffer solutions, salts, metal ions, detergents, environmental influences on protein activity, protease inhibitors **Protein or enzyme isolation:** cell breakdown techniques, determination of protein concentration, protein concentration, dialysis

	Determination of molecular weight by electrophoresis: gel preparation, sample preparation and gel staining **Purification of proteins or enzymes:** immunoblotting, Ion exchange chromatography, gel filtration, affinity chromatography **DNA isolation:** cell splitting techniques, determination of DNA concentration, and DNA concentration **Electrophoresis:** DNA electrophoresis mechanism, DNA electrophoresis equipment, gel making, sample preparation, identification of DNA electrophoresis results **Gene Cloning:** Basic concepts of genetic engineering / gene cloning techniques, cloning vectors, restriction enzymes and competent cells **Identification of gene cloning results:** PCR basic principles, PCR cycle, sequencing, PCR application and sequencing
Study / exam achievements:	Students are considered to be competent and pass if at least get 55 Final score is calculated as follows: 20% participation + 30% assignment + 20% middle exam (UTS) & 30% final exam (UAS) Table index of graduation • A = 4 (85 ≤-≥ 100) • A- = 3,75 (80 ≤-< 85) • B+ = 3,5 (75 ≤- < 80) • B = 3 (70 ≤-< 75) • B- = 2,75 (65 ≤-<75) • C+ = 2,5 (60 ≤-<65) • C = 2 (55 ≤-<60) • D = 1 (40 ≤-<55) • E = 0 (0 ≤-<40)
Media:	Computer, LCD, White board
Learning Methods	Individuals assignment, group assignment, discussion, presentation
Literature:	1. Brown, T.A., 1989, Genetics : A Molecular Approach, London : Van Nostrand Reinhold (International) Co. Ltd. 2. Glick,B.R.,and Pasternak, J.J.,1994, Molecular Biotechnology : Principles and Application of Recombinant DNA, Washington, D.C : ASM Press. 3. Bollag D. 1996. *Protein Method*. New York: John Willey and Sons. Inc 4. Boyer R, 2000. *Modern Experimental Biochemistry*. San Francisco: Addison Wesley Longman 5. Alexander R.R. and Griffiths J.M., 1993, Basic Biochemical Methods, New York : John Willey and Sons. Inc 6. Aehle W, 2007, Enzyme in industry : Production and Application, 3rd edition, Wiley-VCH Verlag GMBH & Co. KgaA Netherland