Module Descriptions

A **module** is a self-contained **learning unit** within a higher education program that includes thematically related courses and is assigned a **fixed number of credits**. It follows specific **learning objectives**, includes an **assessment component**, and contributes to achieving the qualifications of a degree program. In some countries, “modules” are also named “courses”.

Please provide a module description for each module. In addition to the compulsory and elective modules, this also includes credited internships and the final thesis.

Please summarize all module descriptions in one document (Module Handbook) and create a table of contents so that the modules can be found easily.

Module designation	*Bioinformatics and DNA Technology*
Semester(s) in which the module is taught	*5*
Person responsible for the module	*Prof. Dr. Rinaldi Sjahril*
Language	*Bahasa Indonesia*
Relation to curriculum	*Compulsory / ~~elective~~ / specialisation*
Teaching methods	*Face-to-face lectures and independent learning*
Workload (incl. contact hours, self-study hours)	1. *Lectures: 2 × 50 × 16 = 1,600 minutes (26.67 hrs)* 2. *Structured assignments: (total 2 × 60 × 16) = 1,920 minutes (32 hrs)* - *Individual assignments: 2 × 120 × 3 = 720 minutes (12 hrs)* - *Group assignments: 2 × 120 × 3 = 720 minutes (12 hrs)* - *Quiz: 2 × 15 × 8 = 240 minutes (4 hrs)* - *Discussion: 2 × 30 × 4 = 240 minutes (6 hrs)* 3. *Independent study: (total 2 × 60 × 16) = 1,920 minutes (32 hrs)* - *Accessing SIKOLA, participating in online discussion forums, reading materials, etc.* 4. *Practicum: (total: 1 × 170 × 16) = 2,720 minutes (45.33 hrs)* - *Laboratory work: 1 × 170 × 16 = 2,720 minutes (45.33 hrs)*
Credit points	*3 credits equal to 4.86 ECTS*
Required and recommended prerequisites for joining the module	*Plant Genetics* *Plant Breeding*
Module objectives/intended learning outcomes	*In terms of knowledge:* - *Student able to understand and comprehend the concept of plant DNA technology and bioinformatics along with related sciences.*

Content	1. *DNA purification, DNA technology, Polymerase Chain Reaction (PCR), and electrophoresis* 2. *DNA primer design* 3. *Reverse Transcription-PCR (RT-PCR) and PCR Single-Strand Conformation Polymorphism (PCR-SSCP)* 4. *cDNA cloning and genomic DNA cloning using YAC vectors* 5. *Analysis of cloning products and restriction analysis* 6. *Molecular markers: RAPD, RFLP, and AFLP* 7. *Molecular markers: SSR and SNP* 8. *DNA sequencing and microarray analysis* 9. *Databases and advantages of biological databases* 10. *Phylogenetic relationship analysis* 11. *Basic Local Alignment Search Tool (BLAST)* 12. *Quantitative Trait Loci (QTL) analysis* 13. *Omics technology*
Examination forms	*Quiz, individual assignment, group assignment, discussion*
Study and examination requirements	*To successfully pass the module, students must attend at least 80% of the classes, complete all assignments and exams, and obtain a final grade of at least 45%* (minimum passing grade: D).
Reading list	1. *Pevsner, J. 2015. Bioinformatics and Functional Genomics. Wiley-Blackwell, Hoboken, New Jersey.* 2. *Claverie, J.M., and C. Notredame. 2007. Bioinformatics for Dummies. 2nd Edition. Wiley Publishing, Indiana, Canada.* 3. *Fatchiyah. 2015. Prinsip Dasar Bioinformatika. Malang: Universitas Brawijaya Press.*