Course Syllabus

Department of Biotechnology
Faculty of Biotechnology
Atma Jaya Catholic University of Indonesia

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<table>
<tr><td>Course designation</td><td><u>English</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>1st Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Annery Fienta, S.Pd., M.Hum.</td></tr>
<tr><td>Language</td><td>English & Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 ∗ 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 117</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand the correct English structures in the form of sentences, readings, and able to apply it by writing articles</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Students generally have a strong foundation of English competence acquired during elementary, junior high, high school, and family. Unfortunately, in understanding and speaking English, such as reading or writing, they still tend to ignore the correct use of English structures. In this English course, the use of TOEFL test materials is intended to encourage students to be aware of the correct use of English structures, so that when they have to read or write in English, they can understand and use the right structure. In terms of reading, through the TOEFL test materials, they are taught to quickly capture the content of the reading in English. In writing, students are taught to organize their writing systematically. In addition, TOEFL test are also expected to help them to get a job in the future. This course consists of 2 (two) credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>
<table>
<tr><td>✓</td><td>Written test</td></tr>
<tr><td></td><td>Oral test</td></tr>
<tr><td></td><td>Performance test (practical)</td></tr>
<tr><td>✓</td><td>Assignments (papers, projects, portofolios, products)</td></tr>
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</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
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<tr><td>Midterm</td><td>30%</td></tr>
<tr><td>Assignment/Quiz 1</td><td>15%</td></tr>
<tr><td>Assignment/Quiz 2</td><td>25%</td></tr>
<tr><td>Final Exam</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>Main : Philips, D. (2003). Preparation course for the TOEFL test: The paper test. White Plains, NY: Pearson Education.
Internet Source : English Structure Exercises</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Basic Chemistry</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>1st Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Jimmy Suryadi, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 ∗ 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>1 ∗ 170 min</td><td>16</td><td>45,3 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 103</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand the laws and basic fundamentals of chemistry
2. Students are able to perform calculations related to chemistry and chemical reactions
3. Students are able to identify various types of chemical compounds and their characteristics</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Fundamentals of Chemistry is a basic and compulsory course, which consists of lectures and practicum and is intended so that students can understand basic concepts in chemistry that are required in the next courses at the Faculty of Biotechnology. During practicum, students practice to use equipments in the chemistry laboratory and understand chemical reactions in practical and real terms. This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
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<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portfolios, products)
</td></tr>
<tr><td>Study and examination requirements</td><td>
Rating Weight:
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<tr><td>Midterm (written)</td><td>30%</td></tr>
<tr><td>Assignment 1 (practicum)</td><td>30%</td></tr>
<tr><td>Assignment/Quiz 2</td><td>10%</td></tr>
<tr><td>Final Exam (written)</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>

Achmad H, Tupamahu MS. 2001. Stoikiometri Energetika Kimia. Bandung: Citra Aditya Bakti.
Fessenden RJ, Fessenden JS, Pudjaatmaka AH (Translator). 2009. Organic chemistry. Jakarta: Erlangga
Fakultas Bioteknologi. 2015. Penuntun Praktikum Kimia Dasar. Jakarta: Universitas Katolik Indonesia Atma Jaya
Additional:
Achmad H. 2001. Wujud Zat dan Kesetimbangan Kimia. Bandung: Citra Aditya Bakti.
Bettleheim FA, Brown WH, Campbell MK, Farrel SO. Introduction to General, Organic, and Biochemistry. 9th ed. 2010.

</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Introduction to Biotechnology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>1st Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Watumesa Agustina Tan, Ph.D</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 107</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain various aspects of molecular biology related to genetic engineering in improving the biological properties of living organisms
2. Students are able to associate biotechnology principles with nutrigenomics and food product developments
3. Students are able to associate biotechnology principles with bioremediation and renewable energy sources
4. Students are able to associate biotechnology principles with forensics
5. Students are able to associate biotechnology with drug and therapeutic developments</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
In this course, the principles of cell science, DNA, and genetic engineering are explained as the basis of biotechnology. In addition, the development of biotechnology is explained, from the history and principles of biotechnology to the development of genetic engineering, which is applied in producing new varieties of organisms for food ingredients, vaccines, and other things that are useful for the welfare of mankind. In brief, it will</td></tr>
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<table>
<tr><td></td><td>teach the principles of cloning technology and tissue culture as well as the role of nanotechnology in biotechnology. In this course, regulations related to biotechnology products and the ethics of using genetically modified organisms are also taught. In one of the main lecture weeks, there will be a visit to factory or industrial center that is closely related to biotechnology. In one semester, students must also write a paper related to the application of biotechnology and present it in lecture meetings. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☐ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, presentations, videos)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Quiz</td><td>10%</td></tr><tr><td>Post-Class Activities</td><td>50%</td></tr><tr><td>Opening and Closing Impressions</td><td>15%</td></tr><tr><td>Presentation</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Winarno FG, Agustinah W. 2007. Pengantar Bioteknologi. Ed revisi. Bogor: MBrio Press.
Winarno FG, Koswara S. 2002. Food Science Glossary Biotechnology. Bogor: Mbrio Press.
Thieman WJ, Palladino MA. 2004. Introduction to Biotechnology. San Fransisco: Pearson Education, Inc.
Renneberg R. 2008. Biotechnology for Beginners. New York: Elsevier.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Calculus</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>1st Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Drs.Agustinus Silalahi.,MSi.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 115</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand matrix types, concepts, and operations
2. Students are able to calculate limits and understand a continuous or discontinuous functions
3. Students are able to understand the concept of differential and able to calculate differential
4. Students are able to apply differentials to calculate extreme values
5. Sudents are able to understand the concept of integral and able to calculate integrals of elementary functions, integral of trigonometry functions, integral of trigonometry substitutions, integral of frational rational functions, and integral of irrantional functions
6. Students are able to apply integral to calculate flat surface area</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course teaches students about real number system, domain and range of functions, limit of functions and limits of sequences, basic concepts of matrices and matrix algebra</td></tr>
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<tr><td></td><td>operations, matrix rank, determinant of matrix, and matrix inversion. Students are also expected to be able to analyze the continuity of a function, determine the derivative of a function and apply it, and determine the integral of a function and be able to apply it. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>10%</td></tr><tr><td>Final Exam</td><td>45%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Howard, A., Chris, R., Elementary Linear Algebra, 9th ed., John Willey & Sons, 2005.
Noble, B., Daniel, J. W., Applied Linier Algebra, 3rd ed., Prentice Hall, 1988.
Gilbert, S., Linear Algebra and Its Applications, 3rd ed., Saunders HBJ, 1988.
Hadley, Linear Algebra. Massachusetts: Addison-Wesley, 6th printing, 1974.
W. H. Hyatt, Jr., dan J. A. Buck, Engineering Electromagnetics, 6th ed., New York: McGraw-Hill, 2001.
Ayres, F., Diferensial dan Integral Kalkulus, seri Buku schaum, versi SI metric, Erlangga Jakarta.
Purcel, E.J., Valberg,D,I Nyoman Susila, Bana Kartasasmita, Rawuh, Kalkulus dan Geometrik Analitik, Jilid 1 dan Jilid 2, Erlangga,Jakarta,1984</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Introduction to Information Technology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>1st Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Listya U. Karmawan</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 119</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the history of information technology and its role in biotechnology
2. Students are able to operate basic softwares to support education process
3. Students are able to discuss various information literacy skills
4. Students are able to explain various applications of information technology in related to biotechnology</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
In this course, students will be introduced to information technology and its application in the field of Biotechnology in relation to Industry 4.0, the use of the Internet of Things (IoT), and big data. In addition, basic skills and literacy in information technology include Microsoft Office skills (MS Word, MS Excel, MS Powerpoint), basic image processing skills and software for reference management to facilitate scientific writings. This course consists of 2 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment</td><td>30%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Aksoy, P., & DeNardis, L. (2007). Information Technology in Theory. Retrieved from https://books.google.co.id/books?id=KGS5IcixljwC
Fox, R. (2013). Information Technology: An Introduction for Today’s Digital World. Retrieved from https://books.google.co.id/books?id=Y4bNBQAAQBAJ
ICAP. (2013). Introduction to Information Technology. Emile Woolf International.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Concepts and Networks in Biological Systems</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>1st Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ir. Tati Barus, M. Si.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
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<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 121</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain cell organelles and their functions, cell membrane functions, cell communications, cell cycles, and how cells harvest energy
2. Students are able to explain the life and diversity of protists
3. Students are able to explain the structure, growth, and development of plants
4. Students are able to explain about animlas in terms of: organs and their functions, gas exchange circulation, growth, and development</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Biology is a branch of science that studies living things, including cells and their structure and function, evolution, and the diversity of living things and their relationship to the environment. This course consists of 3 credits of lectures.</td></tr>
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<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment 1</td><td>10%</td></tr><tr><td>Assignment 2</td><td>10%</td></tr><tr><td>Assignment 3</td><td>10%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Campbell NA, Reece JB, Taylor MR, Simon EJ. 2008. Biology: Concepts & Connections (Internatl Ed.). The Benjamin Cummings Publishing Co. New York
Raven, Johnson Mason, Losos, Singer. 2008. Biologi (ninth edition). McGrow-Hill International Edition.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Logics</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even/Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Drs. Kasdin Sihotang, M.Hum.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: UAJ 160</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the obstacles, levels, and standards of critical thinking
2. Students are able to explain and find the correlation of critical thinking and arguments
3. Students are able to build critical, logical, and responsible arguments
4. Students are able to identify the elements, quality, and quantity of terms and propositions
5. Students able to draw conclusion and determine to truth value of direct reasoning (opposition and conversion)
6. Students are able to identify, draw concusion, and explain deduction and induction inferences
7. Students are able to identify various fallacies in thinking in society
8. Students are able to compose article critically and analytically</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course discusses various matters related to critical thinking and to develop students thinking pattern and language. In</td></tr>
</table>

<table>
<tr><td></td><td>support of that, the material that will be discussed is an introduction to the limitation to critical thinking, the meaning of critical thinking, levels and elements of critical thinking, the standards of critical thinking, concepts, understandings, arguments, reasonings, syllogisms, inductions, and critical reading and writing, as well as, recognizing various errors in critical thinking. This course consists of 2 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm (Summative + project)</td><td>30%</td></tr><tr><td>Assignment 1 (Individual)</td><td>20%</td></tr><tr><td>Assignment 2 (Group)</td><td>15%</td></tr><tr><td>Final Exam (Summative + paper)</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Main:
Kasdin Sihotang, (2018), Berpikir Kritis: Kecakapan Hidup di Era Digital (2018)l, Yogyakarta: Kanisius.
Addtional:
Alec Fisher, Berpikir Kritis: Sebuah Pengantar (2008), Jakarta: Penerbit Erlangga.
Benyamin Molan (2012), Logika: Ilmu dan Seni Berpikir Kritis, Jakarta: Penerbit Indeks
Saifur Rohman, (2021), Berpikir Kritis: Kaidah Penalaran untuk Hidup Benar dan Selamat, Jakarta: Alfabet</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Multiculturalism</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even/Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Drs. Benyamin Molan</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: UAJ 180</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the importance of Multiculturalism in life
2. Students are able to explain Multiculturalism; lism and ethics in the life of the nation and state
3. Students are able to explain the core values in Multiculturalism
4. Students are able to design a project in an effort to live Multiculturalism in people's lives
5. Students are able to write reflections from the activities designed</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The Multiculturalism course is intended to foster students' awareness of the plurality dimension of human society, especially Indonesian society and develop the ability to be multicultural. To achieve this goal, students will be guided to understand that multiculturalism is a concept of behavior and thinking patterns that continue to be developed in the face of the conditions of a pluralistic society. This concept continues to be developed as a continuous process in order to organize a plural</td></tr>
</table>

<table>
<tr><td></td><td>society (to be) into a multicultural society (Being). In a multiculturalistic society, there is harmony that makes life peaceful, peaceful and stable in harmony and continues to develop and be dynamic in diversity. In its freedom, every citizen is free to express and develop himself in all aspects (dynamic). In equality, every citizen respects the same freedom that also exists in others (stable).</td></tr>
<tr><td>Examination forms</td><td>- Written test
- Oral test
- Performance test (practical)
- Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment 1 (Individual)</td><td>15%</td></tr><tr><td>Assignment 2 (Group)</td><td>20%</td></tr><tr><td>Final Exam (Summative + paper)</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Molan, Benyamin. 2015. Multikuluralisme: Cerdas Membangun Hidup Bersama yang Stabil dan Dinamis, Jakarta: Indeks
Murniati Agustian. 2015. 2015. Pendidikan Multikultural. Jakarta: Penerbit Universitas Katolik Indonesia Atma Jaya
Ata Ujan, Andre, et al. 2009. Multikulturalisme: Belajar Hidup Bersama dalam Perbedaan. Jakarta: Indeks
Nani Nurrahman (ed.) 2022. Aku Orang Indonesia: Persilangan Generasi, Budaya, dan Era Zaman. Jakarta: Konsorsium Psik Kultural Indonesia & Kompas Penerbit Buku.
Parsudi Suparlan. 2004. Hubungan Antar-Suku Bangssa. Jakarta: YPKIK
Parekh, Bukhu. 2000. Rethinking multiculturalism: Cultural Diversity and Policital Theory. New York: Palgrave.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Genetics</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Listya Utami Karmawan</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 104</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to summarize the history and development of the science of genetics, able to analyze trait inheritance patterns including linkage and gene mapping, and correlate its application in everyday life
2. Students are able to explain genetics at cellular level, including the definition of genes, DNA, and chromosomes, to the cell cycle
3. Students are able to explain genetics at molecular level, including the structure of genes, DNA, and chromosomes, and their mutations
4. Students are able to explain the concept of population genetics
5. Students are able to explain the concept of evolutionary genetics</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course presents the history and development of genetics, basic concepts of heredity patterns, perspectives on genetic material at the</td></tr>
</table>

<table>
<tr><td></td><td>cellular and molecular levels, evolutionary genetics, and population genetics. This course will discuss patterns of trait inheritance based on Mendel's first and second laws, trait inheritance involving gene and link interactions, extranuclear trait inheritance, cellular biology regarding genes and chromosomes (including the cell cycle), gene and chromosome mutations (including cancer genetics), gene transfer in bacteria and viruses, and the basic of population and evolutionary genetics. In addition, students are also encouraged to be able to find applications of genetics in everyday life as outlined in lecture assignments. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>✓ Written test
Oral test
Performance test (practical)
✓ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>30%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Snustad, D. Peter; Simmons, Michael J. (2015). Principles of Genetics 7th edition. Wiley. https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=252338
Brown, T. A. (2012). Introduction to Genetics: A Molecular Approach. CRC Press. https://books.google.co.id/books?id=byoWBAAAQBAJ ; https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=175532
Griffiths, A. J. F. (2015). Introduction to genetic analysis 11th edition. W.H. Freeman. https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=207326
Silver, L., Hood, L., Hartwell, L., Goldberg, M., & Reynolds, A. E. (2010). Genetics: From Genes to Genomes. McGraw-Hill Education. https://books.google.co.id/books?id=ie-FPwAACAAJ https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=190302</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Bioanalytical Chemistry</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Daru Seto Bagus Anugrah (M.Eng)</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 100 min</td><td>16</td><td>53,3 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 106</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand the concept of sample preparations and able to implement it at practicum
2. Students are able to understand the concept of titrimetry and able to do titration
3. Students are able to understand the concept of extraction and recrystallization and able to perform extraction of biological compound
4. Students are able to understand the concept of separation through distillation
5. Students are able to understand the concept of chromatography and able to do analysis with Thin Layer Chromatography (TLC) method
6. Students are able to understand the concept of gravimetry and able to implement it at practicum
7. Students are able to understand the concept of UV-Vis Spectrophotometry and able to do analysis with UV-Vis Spectrophotometer</td></tr>
</table>

<table>
<tr><td></td><td>
8. Students are able to understand the concept of Atomic Absorption Spectroscopy and ICP-AES
9. Students are able to understand the concept of biomolecules (carbohydrate, protein, and fat) analysis
10. Students are able to understand the concept of phytochemical compounds analysis
11. Students are able to understand the concept of spectrophotometry IR analysis
12. Students are able to understand the concept of mass spectrophotometry analysis
</td></tr>
<tr><td>Content</td><td>
<u>Course Description:</u>
Bioanalytical chemistry is a compulsory course, which is the application of various techniques and methods of analyzing chemical compounds, especially organic and natural compounds using the basic principles of chemical instrumentation. This course consists of 2 credits of lectures and 1 credit of practicum.
</td></tr>
<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
</td></tr>
<tr><td>Study and examination requirements</td><td>
Rating Weight:
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<tr><td>Practicum/Assignment 1</td><td>30%</td></tr>
<tr><td>Assignment/Quiz 2</td><td>10%</td></tr>
<tr><td>Final Exam</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>
Raymond Chang, 2010, “Chemistry”, McGraw-Hill, USA
T.W. Graham Solomons, “Organic Chemistry”, John Wiley & Sons, USA
Modul Praktikum Kimia Bioanalitis, FTb, Unika Atma Jaya Jakarta 2024.
Anugrah, et al, 2023, “Utilising N-glutaryl chitosan-based film with butterfly pea flower anthocyanin as a freshness indicator of chicken breast”, Packaging Technology and Science, Wiley
Anugrah, et al, 2023, “Development of alginate-based film incorporated with anthocyanins of red cabbage and zinc oxide
</td></tr>
</table>

	nanoparticles as freshness indicator for prawns", International Journal of Biological Macromolecules, Elsevier

<table>
<tr><td>Course designation</td><td><u>Indonesian Language</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Sri Hapsari Wijayanti, S.S., M.Hum.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 110</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to have a sense of pride and awareness of using Indonesian orally and in writing correctly
2. Students are able to apply the understanding and knowledge of language, writing code of ethics, and basic knowledge of biology and technobiology in writing scientific papers
3. Students are able to uphold the ethical code of scientific writing
4. Students are able to collaborate in designing writings or researches, creating scientific works, and presenting it in public</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The Indonesian Language Course teaches how to express ideas in Indonesian in a logical and orderly manner both verbally and in writing in standard scientific forms. Spoken Indonesian is practiced in scientific presentations, while written Indonesian is practiced in writing scientific papers, such as scientific essays/articles, papers, and simple research proposals. This lecture consists of 2 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>15%</td></tr><tr><td>Assignment/Quiz 2</td><td>20%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Priority:
Wijayanti, Sri Hapsari., Amalia Candrayani, Ika Endang.Sri.Hendarwati, dan Jati Wahyono Agustinus. 2014. Bahasa Indonesia Penulisan dan Penyajian Karya Ilmiah. Depok: Rajagrafindo Persada.
Additional:
Badan Pengembangan dan Pembinaan Bahasa Kemendikbud. 2017. Tata Bahasa Baku Bahasa Indonesia.
Badan Pengembangan dan Pembinaan Bahasa Kemendikbudristek. 2021. https://pasti.kemdikbud.go.id/
Badan Pengembangan dan Pembinaan Bahasa Kemendikbudristek. 2022. Ejaan Bahasa Indonesia yang Disempurnakan Edisi V. https://ejaan.kemdikbud.go.id/
Badan Pengembangan dan Pembinaan Bahasa Kemendikbud. 2017. Tata Bahasa Baku Bahasa Indonesia.
Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kementerian Riset, Teknologi, dan Pendikan Tinggi. 2016. Bahasa Indonesia untuk Perguruan Tinggi. Buku Ajar Mata Kuliah Wajib Umum Bahasa Indonesia. Jakarta: Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kementerian Riset, Teknologi, dan Pendikan Tinggi
Direktorat Pembelajaran dan Kemahasiswaan Kemendikbudristek. 2024. Program Kreativitas Mahasiswa. https://simbelmawa.kemdikbud.go.id/portal/penerimaan-proposal-pkm-2024/
Kalidjernih, Freddy K. 2010. Penulisan Akademik. Jakarta: Widya Aksara Press.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Biochemistry Laboratory</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yanti</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Practicum</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (0-2)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 114</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to identify the various biochemical instruments, how they work, their functions and able to use it at experimental practicum at biochemistry laboratory
2. Students are able to explain the principles, analyses, extraction methods, and solubilities, and the analytical instrument used for biomolecules (protein, carbohydrate, fat, and nucleic acid) analysis
3. Students are able to master the usage of various biochemicistry laboratory instruments used for qualitative and quantitative analysis, and characterize biomolecules (protein, carbohydrate, fat, and nucleic acid)
4. Students are able to comprehend analysis methods and results interpretation qualitatively and quantitatively from the experiments at biochemistry laboratory</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course provides basic understanding and laboratory skills in various biochemical topics, including protein extraction and</td></tr>
</table>

<table>
<tr><td></td><td>analysis methods, enzyme characteristics and kinetics, carbohydrate extraction and enzymatic reactions to break down carbohydrates, lipid biochemical reactions, photosynthesis, and nucleic acid extraction. This course consists of 2 credits of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1</td><td>50%</td></tr><tr><td>Final Exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Main:
Lehninger Principles of Biochemistry (4th Ed.) Nelson, D., and Cox, M.; W.H. Freeman and Company, New York, 2005.

Additional:
Text book and journal abour biochemistry laboratory engineering</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Physiology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Anastasia Tatik Hartanti, M. Si.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 116</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the principles and theoretical concepts of cell and molecular biology, micromolecules, ecology, and evolution
2. Students are able to apply the concepts of physiology and to benefit for themselves and society
3. Students are able to compile papers on physiology both individually and in groups</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course covers additional physiology (photosynthesis, respiration, and secondary metabolites) and animal and human physiology (fundamentals of metabolism, respiratory system, reproductive system, digestive, and the cardiovascular system). This course consists of 2 credits of lectures.</td></tr>
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<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>10%</td></tr><tr><td>Assignment/Quiz 3</td><td>10%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Lincoln T, Eduardo Z. 1991. Plant Physiology. New York: The Benjamin Cummings Publishing.
Ganong WF. 2005. Review of Medical Physiology. Ed ke-22. McGraw-Hill Co.
Reece JB, Urry LA, Cain ML, Wasserman SA, Minorsky PV, Jackson RB. 2011. Biology Campbell. San Fransisco; Pearson education, Inc.
Sherwood L. 2004. Human Physiology: From Cells to System. Ed ke-5. Belmont: West Publishing Co.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Biochemistry</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Prof. Dr. Ir. Maggy T. Suhartono</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 118</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand the unique characteristics of living organisms and cells, and able to explain different parts and funtions of cells
2. Students are able to understand the concept of biomolecules
3. Students are able to explain the structures and characteristics of different kinds of amino acids
4. Students are able define the primary, secondary, tertiary and quarternary structure of protein and explain the functions of some examples of functional proteins
5. Students are able to understand the analysis, extraction, and purification of protein
6. Students are able to understand the characteristics, roles, and kinetics of enzyme
7. Students are able to understand the reactions that produce ATP, glycolysis, Krebs cycle, electron transport, and beta oxidation
8. Students are able to differentiate the light and dark reaction of photosynthesis</td></tr>
</table>

<table>
<tr><td></td><td>
9. Students are able to define the structure of DNA, RNA, and enzyme or protein that partake in the process of replication, transcription, and translation
10. Students are able to understand the principles of biochemistry in new era of biotechnology, genetic manipulation, and bioinformatic
</td></tr>
<tr><td>Content</td><td>
<u>Course Description:</u>
Biochemistry provides an understanding of biomolecules, cells and their parts as locations for biochemical reactions, the character of amino acids and proteins and their separation principles, biochemistry and enzyme kinetics, some examples of functional proteins, energy metabolism (glycolysis, Krebs cycle, electron transport, fatty acid oxidation, and photosynthesis), nucleic acid biochemistry, replication, transcription, and translation. This course consists of 3 credits of lectures.
</td></tr>
<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
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Rating Weight:
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<tr><td>Midterm</td><td>40%</td></tr>
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<tr><td>Assignment/Quiz 2</td><td>10%</td></tr>
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<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>

Lehninger A. 2000. Principles of Biochemistry. Terjemahan ke dalam bahasa Indonesia oleh Maggy Thenawidjaja. Jilid 1, 2, 3. Jakarta: Penerbit Erlangga.
Thenawidjaja Maggy, Debbie S Retnoningrum dan Wangsa Tirt Ismaya. 20117. Protein. Serial Biokimia Mudah dan Menggugah. Penerbit Gramedia. Jakarta 241 hal.
Voet D, Voet JG, Pratt CW. 2002. Fundamentals of Biochemistry. 2002. John Wiley and Sons.
Garrelt RH, Grishman CM. 1999. Biochemistry. Saunders College Publishing.

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<table>
<tr><td>Course designation</td><td><u>Biophysics</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>2nd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Daru Seto Bagus Anugrah, S.Si., M.Eng.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 122</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the basic concept of mechanics in biological process
2. Students are able to explain the basic concept of thermodynamics in biological process
3. Students are able to explain the basic concept of waves and sounds in biological process
4. Students are able to explain the basic concept of electricity and magnetism in biological process
5. Students are able to explain the basic concept of nanotechnology in biological process</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
On this course, students will learn about the concept of physics. The learning materials to be studied are particle kinematics and dynamics, work and energy, impulse and momentum, rotation and torque, fluid statics and dynamics, thermodynamics, electricity, magnetism, and waves. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>25%</td></tr><tr><td>Assignment/Quiz 2</td><td>15%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Diao AL, Gunawan AW, Aruan DA, Kusuma S, Adriyanto S. 2014. Literasi Informasi: 7 Langkah Knowledge Management. Jakarta (ID): Universitas Atma Jaya Pr.
Pedoman Program Kreativitas Mahasiswa, Ed. 2020.
Informasi dari Direktorat Jenderal Hak Kekayaan Intelektual, Kementrian Hukum dan Hak Asasi Manusia Republik Indonesia.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Catholicism / Religion Education</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd/Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Harum Hendrikus, Drs.,MM and Ignasius Joko Suyanto, Drs.,M.Hum</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: AGA 110 / UAJ 150</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the church's views on people, religion, Jesus Christ and the church
2. Students are able to explain the Catholic church's views on religious plurality and the importance of religious dialogue
3. Students are able to design assignments to realize the core values of KUPP
4. Students are able to report the results of observation both orally through group presentations and in writing and are able to reflect on the main values found in the observation process</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course is intended to provide a basic basis of knowledge derived from the official teachings of the Catholic church on: Man; Human beings as religious beings; Religious Man, Religious Plurality and Religious Dialogue and Jesus Christ His Work and Teachings as well as about the Church and the Duties of the Church. Through this lecture process, it is hoped that students can live their faith according to the pattern of Jesus Christ and be responsible and implement it in life in line with</td></tr>
</table>

<table>
<tr><td></td><td>the Atma Jaya Unika Core Values listed in the Atma Jaya Foundation Memorandum on the Development of Core Values: Christian, Superior, Professional, Caring.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm (Summative + project)</td><td>30%</td></tr><tr><td>Assignment 1 (Individual)</td><td>15%</td></tr><tr><td>Assignment 2 (Group)</td><td>25%</td></tr><tr><td>Final Exam (Summative + paper)</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Catholicism
Atma Jaya Jakarta Foundation, 2015 Nota Yayasan Atma Jaya tentang Pengembangan Nilai Inti: Kristiani, Unggul,Profesional, Peduli.
Indonesian Bishops Conference, Department of Documentation and information
1992 Paus Yohanes Paulus II. Konstitusi Apostolik tentang Universitas Katolik. Jakarta : Dokpen KWI
1993 Dokumen Konsili Vatikan II. Jakarata: Dokpen KWI
2009 Ensiklik Bapa Suci Paus Yohanes Paulus II. Iman dan Akal Budi. Jakarta : Dokpen KWI
2014 Ensiklik Bapa Suci Paus Fransiskus mengenai Iman. Cahaya Iman. Jakarta : Dokpen KWI
Religion Education:
Suyanto, Joko, dkk. 2016. Agama dan Moral. Bekasi: Bintang Kejora.
Tarigan, J., Kama, VF., Hardijantan, B.D., Akal Budi & Iman. Jakarta: Atma Jaya University Press, 2014.
Atma Jaya Jakarta Foundation, 2015 Nota Yayasan Atma Jaya tentang Pengembangan Nilai Inti: Kristiani, Unggul,Profesional, Peduli.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Molecular Biology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>3rd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yogiara, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 207</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand physical and chemical structures of DNA
2. Students are able to explain DNA replications
3. Students are able to explain the principles of gene expression and regulation
4. Students are able to determine the consequences of epigenetic mechanisms and biological development on the nature of living organisms
5. Students are able to distinguish the variation of genetics caused by mutation and transposition</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Molecular biology is a branch of biology that refers to biological study at the molecular level. This course discusses concepts related to central dogma, replication, transcription, translation, and mutations in DNA and their implications for life. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>40</td></tr><tr><td>Presentation</td><td>20%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Snyder, L. Peters JE, Henkin TM, and W. Champness. 2013. Molecular Genetics of Bacteria. Ed. Ke-4. ASM Press, Washington, D.C.
Watson J, Baker TA, Bell S, Gan A. 2008. Molecular Biology of the Gene. Ed. Ke-6. Pearson Education. San Fransisco
Yogiara; Kim, D.; Hwang, J.-K.; Pan, J.-G. Escherichia coli ASKA Clone Library Harboring tRNA-Specific Adenosine Deaminase (tadA) Reveals Resistance towards Xanthorrhizol. Molecules 2015, 20, 16290-16305.
https://doi.org/10.3390/molecules200916290
Yogiara, Mordukhova EA, Kim D, Kim WG, Hwang JK, Pan JG. The food-grade antimicrobial xanthorrhizol targets the enoyl-ACP reductase (FabI) in Escherichia coli. Bioorg Med Chem Lett. 2020 Dec 15;30(24):127651. doi: 10.1016/j.bmcl.2020.127651. Epub 2020 Oct 29. PMID: 33130290.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Microbiology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>3rd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yogiara, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 209</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain and understand the basic structure and function of prokaryotes
2. Students are able to explain and understand the growth and contro of microbial growth and mechanism of action of antibiotics against microbes
3. Students are able to explain and understand metabolism and genetics of microbes
4. Students are able to explain and compare the diversity of prokaryotes, eukaryotes, and virus
5. Students are able to explain symbiosis between microbes</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course provides the fundamentals of microbial life and its role. It includes the development of microbiology, basic structure and function, growth and growth control, metabolism, microbial genetics, antibiotics, prokaryotes, eukaryotes, and viruses. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>20%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Madigan MT, Bender KS, Buckley DH, Satley WM, Stahl. DA. 2022. Brock Biology of Microorganism 16th Ed. Pearson. Global Edition.
Black JG, Black LJ. 2015. Microbiology: Principles and Explorations. 9th Ed. John Wiley & Sons, Inc.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Microbiology Laboratory</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>3rd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Stella Magdalena, M.Si.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Practicum</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (0-3)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 211</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to apply basic microbiology techniques
2. Students are able to count and isolate microbes
3. Students are able to characterize and analyze microbes based on their metabolism and structure microscopically and macroscopically
4. Students are able to test and analyze antimicrobial resistance</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course discusses basic microbiological techniques, such as macroscopic and microscopic observations of microorganisms, sterilization and inoculation techniques, microbial identification techniques through biochemical and staining tests, and antimicrobial potency test. This course consists of 3 credits of practicum.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
</td></tr>
<tr><td>Study and examination requirements</td><td>
Rating Weight:
<table>
<tr><td>Midterm</td><td>30%</td></tr>
<tr><td>Assignment/Quiz 1</td><td>10%</td></tr>
<tr><td>Assignment/Quiz 2</td><td>20%</td></tr>
<tr><td>Final Exam</td><td>40%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>
Benson, H.J. 2002. Microbiological Applications: Laboratory Manual in General Microbiology. 8th Edition. New York: McGraw-Hill
Cappucino, J.G., N. Sherman. 2005. Microbiology: A Laboratory Manual. 7th Edition. San Francisco: Pearson Benyamin Cummings.
</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Immunology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>3rd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yanti (PhD)</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 213</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain about innate immune response towards antigens and microorganisms
2. Students are able to explain about adaptive immune response towards antigens and microorganisms
3. Students are able to explain the interaction, production, and mechanism of antibodies
4. Students are able to explain immunology concepts in a variety of diagnostics, preventive, and therapeutic related case</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The learning material in this course includes: the relationship between the immune system and biotechnology, basic immune response mechanisms, antigen and antibody reactions, immunochemical methods, immune system products that can be produced in vitro, and biotechnology and its uses in the field of medicine. In addition, applicative topics will be selected according to needs and timing, such as: immunity against viruses, cancer, and infections, and products of the immune system that</td></tr>
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<tr><td></td><td>can be produced with the application of biotechnology. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>20%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Abbas A, Litchman A, Pillai S. 2019. Basic Immunology: Functions and Disorders of the Immune System, 6th Ed. Netherland: Elsevier.
Recent article and journal (national dan international) about immunity research and the application</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Nutrigenomics</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>3rd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dionysius Subali, M.Biotek.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 215</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to describe the definition of nutrition, nutrigenomics and nutrigenetics and the factors that limit it
2. Students are able to explain the relationship between nutrition and genetic material in nutrigenomics and molecular nutrigenetics
3. Students are able to implement the role of nutrition and lifestyle for the control of genetic function (epigenetics) for disease prevention, especially metabolic syndrome disease
4. Students are able to implement nutrigenomics and nutrigenetics analysis methods</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Nutrition in food is one of the important factors that affect human health. Several studies in the field of biotechnology have proven that the food consumed by humans affects the expression of certain genes. Nutrigenomics is a discipline that studies the influence of nutrition on gene expression. This course will</td></tr>
</table>

<table>
<tr><td></td><td>provide knowledge about the concept of nutrigenomics, the influence of nutrition and lifestyle on genomic health, and examples of its application in various aspects of human life.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1</td><td>15%</td></tr><tr><td>Assignment/Quiz 2</td><td>30%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Main :
Kaput J, Rodriguez RL. 2006. Nutritional Genomics: Discovering the Path to Personalized Nutrition.
McGuire M, Beerman KA. 2007. Nutritional Sciences: From Fundamentals to Food.
Wardlaw et al. 2004. Perspectives in Nutrition.
Additional :
Nutrigenomics Journal</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Data Processing in Biology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>3rd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ir. Rory A Hutagalung, DEA</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 217</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to tabulate and analyze data using descriptive statistical techniques and formulas and able to apply descriptive statistical formulasi according to the problem
2. Students are able to understand the role of probability in inferential statistics and able to analyze data using probability theory and probability distribution
3. Students are able to understand the role of sampling in inferential statistics and able to analyze data using sampling theory and sampling distribution
4. Students are able to select and apply statistics formulas in accordance with the data and problems to estimate parameters or analyze sampel data in order to test the hypothesis and able to interpret the output to draw conclusions</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Biological Data Processing is a branch of knowledge about the collection, classification, presentation, and processing of</td></tr>
</table>

<table>
<tr><td></td><td>biological data in order to describe the data, to draw conclusions, and to make decisions based on the data using scientifically justifiable reasons. This course will discuss data and their characteristics, data processing with descriptive statistics, the basic of inferential statistics (probability and its distribution, sampling, and samples), sample data processing for parameter estimation and hypothesis testing (descriptive hypothesis, comparative hypothesis, and associative hyptothesis) both parametric and non-parametric. In addition, data processing is assisted by using statistical software. This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1</td><td>25%</td></tr><tr><td>Assignment/Quiz 2</td><td>25%</td></tr><tr><td>Final Exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Lind DA, Marchal WG, Wathen SA. 2014. Statistical Techniques in Business & Economics. 16th edition. McGraw-Hill
International. 830 pp.
Budiarto, E. 2002. Biostatistika untuk Kedokteran dan Kesehatan Masyarakat. Penerbit Buku Kedokteran EGC. Jakarta
Sudjana. 1992. Metoda Statistika. Tarsito. Bandung.
Sugiyono, 2005. Statistika untuk Penelitian. Cetakan kedelapan. C V Alfabeta, Bandung
Walpole, R. E. 1982. Pengantar Statistika. Gramedia Pustaka Utama, Jakarta</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Pancasila</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even/Odd semester</td></tr>
<tr><td>Person responsible for the course</td><td>Febiana Rima K, M.Hum</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: PAN 100</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the importance of Citizenship Education as a process of 'Indonesianization' in the framework of active participation of citizens in the life of the nation and state and national development
2. Students are able to explain the understanding of the typical Indonesian state and the process of becoming an Indonesian nation-state
3. Students are able to explain the crikhas of Indonesia as a nation and archipelago, as well as a democratic state of law and the importance of law enforcement for the upholding of democratic values
4. Students are able to explain Indonesia's geopolitics and geostrategy in order to maintain the existence of the Republic of Indonesia</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The Pancasila Education course discusses the historical foundations of Pancasila, the national values contained in Pancasila, and the implementation of these values in the life of the nation and state.</td></tr>
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<table>
<tr><td></td><td></td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment 1 (Individual)</td><td>10%</td></tr><tr><td>Assignment 2 (Group: presentation proposal)</td><td>15%</td></tr><tr><td>Assignment 3 (Group: project result)</td><td>15%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Kasdin Sihotang, dkk (2014), Pendidikan Pancasila, Jakarta: Penerbit Atma Jaya.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Ecology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ir. Rory A Hutagalung, DEA</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 202</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to describe the variety, interactions, and cycles in ecosystems and analyze the impact of changes in ecosystems
2. Students are able to describe the individual traits in population and able to predict and analyze the dynamics or changes in populations
3. Students are able to describe the various interactions of populations in community and able to predict and analyze the dynamics or changes in ecosystems
4. Students are able to describe the cause of interference in ecosystems and analyze their impacts and find the solutions</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course elaborates the reciprocal and inseparable relationship between organisms and their environment. For this purpose, this course will discuss the definition and scope of ecology, ecosystems and ecosystem types, energy flows, biogeochemical cycles, limiting factors, population dynamics, community,</td></tr>
</table>

<table>
<tr><td></td><td>succession, population growth and anthropogenic impacts, and biological conservation and ecological restoration. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1 (participation in lecture)</td><td>30%</td></tr><tr><td>Assignment/Quiz 2</td><td>20%</td></tr><tr><td>Final Exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Odum, EP. 1983. Basic Ecology. Saunder's College Publishing. New York
Campbell, NA and Reece, JB. 2005. Biology.Pearson Publishing.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Fungal Biotechnology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Anastasia Tatik Hartanti</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 208</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the variety of modern biological science so that students have ideads for further research in food sector
2. Students are able to explain the basics of biological science related with the idea to improve the food in Indonesia through approaches from food technology
3. Students are able to recognize the biodiversity that can be beneficial for human welfare in food sector through approaches from food technology</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course is about fungal biodiversity, covering the world of Fungi, Chromista, and Protoctista and physiology, genetics, identification, and use of fungi by humans in biotechnology. This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
</td></tr>
<tr><td>Study and examination requirements</td><td>
Rating Weight:
<table>
<tr><td>Midterm</td><td>25%</td></tr>
<tr><td>Assignment/Quiz 1</td><td>30%</td></tr>
<tr><td>Assignment/Quiz 2</td><td>10%</td></tr>
<tr><td>Assignment/Quiz 3</td><td>10%</td></tr>
<tr><td>Final Exam</td><td>25%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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</td></tr>
<tr><td>Reading list</td><td>

Alexopoulos CJ, Mims CW, Blackwell M. 1996. Introductory Mycology. Ed ke-4. New York (US): J Wiley.
Gunawan AW, Hartanti AT. 2018. Biologi & Bioteknologi Cendawan dalam Praktik. Ed ke-4. Jakarta: Univ Atma Jaya Pr.
Hawksworth DL, Kirk PM, Sutton BC, Pegler DM. 1995. Ainsworth and Bisby’s Dictionary of the Fungi. Ed ke-8. Wallingford (GB): CAB.
Herliyana, E N. 2014. Biodiversitas dan Potensi Cendawan di Indonesia. Bogor (ID): IPB Pr.
Kavanagh K. 2005. Fungi Biology and Application. Chichedter: John Wiley.
Moore-Landecker E. 1996. Fundamentals of the Fungi. New Jersey (US): Prentice Hall.
Renneberg R. 2007. Biotechnology for Beginners. New York (US): Academic Press.
http:www.wisc.edu/botany/fungi/volkmyco.html

</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Environmental Microbiology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Watumesa Agustina Tan, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 214</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to classify the characteristics of various microbe habitat
2. Students are able to explore the role of microbe in biogeochemical cycle
3. Students are able to explore the examples of pathogenic microbe in the environment
4. Students are able to apply various beneficial microbe in the environment</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course provides basic knowledge about the role of microbes in the environment. Learning materials include habitats, biogeochemical cycles, microbes in extreme environments, environmentally friendly products, pathogens in the environment, and the role of microbes in waste treatment, biodegradation, and biotransformation. Practicum course is provided to support lectures.</td></tr>
</table>

<table>
<tr><td></td><td>This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm + Project 1</td><td>30%</td></tr><tr><td>Practicum</td><td>40%</td></tr><tr><td>Final Exam (Project 2)</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Pepper, I.L., Gerba, C.P., Gentry, T.J. and Maier, R.M. eds., 2011. Environmental microbiology. Academic press.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Biomolecular Techniques</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yogiara, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 216</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to master the principles of isolation and detection of nucleic acids
2. Students are able to design strategy for moleculer cloning
3. Students are able to apply molecular cloning techniques
4. Students are able to analyze gene expressions
5. Students are able to engineer gene expressions
6. Students are able to adapt and know the changes in science and technology, especially related to DNA technology
7. Students are able to understand the ethics and their pros and cons that appear from the application of a technology</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course teaches about genome dynamics, regulation and control of gene expression, plasmid and the transfer in prokaryotes and eukaryotes, enzymology in molecular cloning, cloning strategies, and plasmid mapping. Explanations regarding genome editing, system and synthetic biology, human genome, microbiome, and epigenetics are taught in this course. This course also introduces students with the knowledge of pros and cons of</td></tr>
</table>

<table>
<tr><td></td><td>agricultural biotechnology, bioethics, and patents. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>40%</td></tr><tr><td>Assignment/Quiz 1</td><td>20%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Glick, BR and JJ Pasternak. 3rd Ed. 2003. Molecular Biotechnology: Principles and application of recombinat DNA. ASM Press, Washington, D.C.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Biomolecular Techniques Laboratory</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Watumesa A. Tan</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Practicum</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (0-3)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 218</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the principles of molecular techniques
2. Students are able to perform the molecular techniques
3. Students are able to analyze and interpretate the results from the molecular techniques
4. Students are able to design work protocol to solve problems</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course teaches basic skills of DNA isolation, both plasmid DNA and genomic DNA isolations, agarose electrophoresis principles and techniques, genetic material transfer techniques, namely transformation and conjugation, Polymerase Chain Reaction (PCR), Real Time PCR, molecular cloning principles and techniques, transposon mutagenesis, and identification of bacteria using 16S-rRNA gene sequences. This course consists of 3 credits of practicum.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>20%</td></tr><tr><td>Pre-Laboratory Assignments</td><td>10%</td></tr><tr><td>Post-Laboratory Assignments</td><td>20%</td></tr><tr><td>Work Protocols</td><td>30%</td></tr><tr><td>Quiz</td><td>10%</td></tr><tr><td>Evaluations</td><td>10%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Watson JD, et al. 2014. Molecular Biology of the Gene. Ed ke-7. New Jersey: Pearson.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Industrial Microbiology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ir. Tati Barus, M. Si</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 311</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to actively participate and understand techniques in industrial microbiology S9, S10, K1, K3, KK2, KK5, KK6, P1, P3, P7
2. Students are able to actively participate and understand the application of microbes in the S9, S10, K1, K3, KK2, KK5, KK6, P3, P5, P7 industries</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course discusses the role and function of microorganisms in industry, aspects that play a role in the production/industrial process of primary metabolites, secondary metabolites, cell biomass, and biotransformation products.</td></tr>
<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
</td></tr>
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<tr><td>Study and examination requirements</td><td>Rating Weight:
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<tr><td>Reading list</td><td>PUSTAKA Doble, M., A.K.Kruthiventi and V.G. Gaikar. 2004. Biotransformations and bioprocess.
Marcel Dekker, New York L.P. Wackett and C.D. Hershberger. 2001. Biocatalysis and Biodegradation: Microbial Transformation of Organic Compounds ASM Press, Washington DC Nduka Okafor. 2018. Modern industrial microbiology and biotechnology. Science Publishers, New Hampshire, United States of America</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Citizenship</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>4th semester</td></tr>
<tr><td>Person responsible for the course</td><td>Benyamin Mali, M.Kesos</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: WAR 130</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the importance of Citizenship Education as a process of 'Indonesianization' in the framework of active participation of citizens in the life of the nation and state and national development
2. Students are able to explain the understanding of the typical Indonesian state and the process of becoming an Indonesian nation-state
3. Students are able to explain the crikhas of Indonesia as a nation and archipelago, as well as a democratic state of law and the importance of law enforcement for the upholding of democratic values
4. Students are able to explain Indonesia's geopolitics and geostrategy in order to maintain the existence of the Republic of Indonesia</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Citizenship Education is essentially a process of INDONESIANIZATION, a systematic effort to Indonesianize Indonesians so that they truly become 100% Indonesian, truly rooted in Indonesian values. Rooted in Indonesian values, building</td></tr>
</table>

<table>
<tr><td></td><td>a world civilization based on universal human values. In it, it discusses the following: (i) citizens and the state, the relationship between the two, their respective rights and obligations based on Pancasila and the 1945 Constitution; (ii) The essence of the state: functions, duties, objectives and sovereignty of the state, sovereignty of the people (democracy) and rule of law (nomocracy), as well as human rights. In the context of reform, (iii) the changes that occurred in the Indonesian constitutional system after the amendment of the 1945 NRI Constitution were also discussed; All materials culminated in material (iv) geopolitics and geostrategy of Indonesia, which discussed the Nusantara Vision as the *visionary foundation of national development, and National Resilience as the conceptual foundation of national development. All materials are intended to equip students for their future duties as future leaders of the nation and state.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
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<tr><td>Reading list</td><td>Main:
Citizenship E-Book as Student Handbook
Additional:
All reference from eletectronic media</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Cell and Tissue Culture Techniques</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Yasinta Ratna Esti Wulandari, M.Si.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 4 (2-2)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 303</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to apply basic theory and principle of plant cell and tissue culture
2. Students are able to describe the process of cel regeneration into whole plants and to explain the metabolism that occurs in plant cell and tissue culture
3. Students are able to analyze various applications of cell and tissue culture techniques for improving human welfare
4. Students are able to evaluate the principals and practices of plant cell and tissue culture techniques in the laboratory</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
In this course, students will study the basic science, concepts, and techniques for aseptic culture of plant cell and plant tissue, including micropropagation techniques and plantlet acclimatization in greenhouse. Students are also stimulated to be able to develop the concept of plant tissue culture for the</td></tr>
</table>

<table>
<tr><td></td><td>production process. This course consists of 2 credits of lectures and 2 credits of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment 1 (Presentation)</td><td>10%</td></tr><tr><td>Assignment 2</td><td>5%</td></tr><tr><td>Practicum</td><td>35%</td></tr><tr><td>Final Exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Dodds, P. N., & Rathjen, J. P. (2010). Plant immunity: towards an integrated view of plant–pathogen interactions. Nature Reviews Genetics, 11(8), 539–548. https://doi.org/10.1038/nrg2812
Evans, D. E., Coleman, J. O. D., & Kearns, A. (2003). Plant Cell Culture. Retrieved from https://books.google.co.id/books?id=OUA4k90U66gC
George, E. F., Hall, M. A., & De Klerk, G. J. (2007). Plant Propagation by Tissue Culture: Volume 1. The Background (3rd ed.). Retrieved from https://books.google.co.id/books?id=55X_Wjct7f0C
Lea, P., & Leegood, R. C. (1999). Plant Biochemistry and Molecular Biology (2nd ed.). Retrieved from https://books.google.co.id/books?id=GYDPvgEACAAJ
Pierik, R. L. M. (2012). In Vitro Culture of Higher Plants. Retrieved from https://books.google.co.id/books?id=zX8QBwAAQBAJ</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Enzyme Biotechnology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Prof. Maggy T. Suhartono</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 305</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand the basic characteristics of enzyme
2. Students are able to indicate various source of enzymes and their productions
3. Students are able to indicate various enzyme fermentations and the influencing factors for enzyme production from microbes
4. Students are able to understand the analysis, extraction, and purification of enzymes
5. Students are able to indicate the application of enzymes in industrial, agricultural, food, medical, environmental, and molecular research
6. Students are able to understand enzyme inhibitors and their medical applications
7. Students are able to understand various modern techniques for production and analysis of enzyme
8. Students are able to comprehend enzymes that are currently renowned</td></tr>
</table>

<table>
<tr><td>Content</td><td><u>Course Description:</u>
This course provides an understanding of various aspects of enzymes, from the characters of enzyme structure, sources, characteristics, extraction techniques, isolation and purification of enzymes, to applications of enzyme in industry, agriculture, environment, health, food, and molecular research. The topic of enzyme inhibitors will be discussed in relation to their application in the health sector. The discussion continues with case studies of several enzymes. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>40%</td></tr><tr><td>Assignment/Quiz 1</td><td>20%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Palmer T. 1991. Understanding Enzymes. 3rd ed. New Yark: Ellis Horwood.
Kennedy JF. 1987. Enzyme Technology in Biotechnology Volume 7a. (Rehm HJ, and Reed G eds). Germany: VCH Weinheim.
Glick BR, Pasternak JR. 1994. Molecular Biotechnology. American Society for Microbiology</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Fermentation Technology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Eng. Hans Wijaya, S.T., M.T.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
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<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 4 (3-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 307</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to differentiate types of fermentation and calculate the kinetic parameters of each fermentation type
2. Students are able to analyze and create the outline for fermentation optimization through intrinsic and extrinsic factors
3. Students are able to design steps for optimization in production of various metabolites from microorganisms or laboratory-scale waste treatment</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Fermentation technology has been applied conventionally to produce fermented food or feed. According to its development, fermentation technology is also applied to produce various types of primary and secondary metabolites. This course elaborates the history and development of fermentation, isolation of microbes and microbial enhancement, the basic principles and types of fermentation, kinetic calculations, and upstream and downstream</td></tr>
</table>

<table>
<tr><td></td><td>processes in a series of fermentation processes. Applications of the fermentation process in solid state fermentation products and submerged cultures are also presented in the form of discussions and experimental design papers. This course consists of 2 credits of lectures and supported by 1 credit of practicum activities that will be adjusted to the lecture topic for one semester.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Practicum</td><td>20%</td></tr><tr><td>Assignment 1</td><td>10%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Bailey EB, Ollis DF. 1986. Biochemical engineering fundamentals. Second edition. Singapore: McGraw-Hill book company.
Crueger W, Crueger A. 1982. Biotechnology: A Textbook of Industrial Microbiology. Madison: Science Tech.
Demain AL, Solomon NA. 1986. Manual of Industrial Microbiology and Biotechnology. Washington DC: American Society for Microbiology.
Doran PM. 2004. Bioprocess engineering principles, London: Elsevier.
Scragg A. 1988. Biotechnology for Engineers: Biological Systems in Technological Processes. New York: Ellen Horwood Limited.
Shuler ML, Kargi F. 1992. Bioprocess Engineering Basic Concepts. New Jersey: PrenticeHall.
Stanbury PF, Whitaker A. 1984. Fermentation of Technology. New York: Pergamon Press.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Bioinformatics</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Adi Yulandi, S.Si., MT</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 309</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to analyze data from Sanger and Next Generation Sequencing (NGS)
2. Students are able to access and use molecular biology databases
3. Students are able to perform pairwise alignment analysis and Basic Local Aligment Search Tools (BLAST)
4. Students are able to perform Mutiple Sequence Aignment analysis and able to construct phylogenetic tree
5. Students are able to perform genome assembly analysis
6. Students are able to perform genome comparison analysis
7. Students are able to perform metagenomic analysis
8. Students are able to perform Phyton programming
9. Students are able to perform the analysis of primary, secondary, and tertiary structure of proteins</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course covers the discussion of the definition and application of bioinformatics, biological databases of molecular biology data, comparison of molecular biology data sequences,</td></tr>
</table>

<table>
<tr><td></td><td>molecular phonogenetics, prediction and visualization of protein structures, and introduction to programming for bioinformatics. This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☐ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Practicum</td><td>40%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Selzer PM, Marhofer RJ, Koch O. 2018. Applied Bioinformatics, An Introduction. Ed.ke-2. Swiss: Springer.
Zvelebil MJ, Jeremy OB. 2008. Understanding Bioinformatics. New York: Garland Science, 2008</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Environmental Pollution Control and Bioremediation</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Watumesa Agustina Tan, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 310</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to analyze the potential waste generated from various human activities
2. Students are able to make method outline in prevention and treatment of various waste
3. Students are able to explain the principles and applications of bioremediation in waste treatment</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course covers a range of cutting-edge technologies used to control environmental pollution. Starting from the concept of environmental impact assessment, students will analyze the potential pollution generated by human activities in the form of solid, liquid (domestic and industrial waste), and air. Techniques that can be applied to mitigate and monitor these various types of waste are explores. In addition, students explore the utilization of various microorganisms in the bioremediation of toxic and hazardous wastes that are hydrocarbons, aromatic compounds, xenobiotics, and heavy metals. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☐ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm (Case studies)</td><td>45%</td></tr><tr><td>Popular Scientific Articles</td><td>45%</td></tr><tr><td>Final Exam (Evaluations)</td><td>10%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Chandra R. 2015. Advances in Biodegradation and Bioremediation of Industrial Waste. Boca Raton: CRC Press.
Das S. 2015. Microbial Biodegradation and Bioremediation 1st Ed. Amsterdam: Elsevier.
Datta S, Rajnish KN, Samuel MS, Pugazlendhi A, Selvarajan E. 2020. Metagenomic applications in microbial diversity, bioremediation, pollution monitoring, enzyme and drug discovery. A review. Environmental Chemistry Letters 18(4):1229-41. https://doi.org/10.1007/s10311-020-01010-z
Tan WA, Parales RE. 2019. Hydrocarbon Degradation by Betaproteobacteria. In: McGenity, T (ed). Handbook of Hydrocarbon and Lipid Microbiology. pp. 1-18. Berlin: Springer Berlin Heidelberg.
Tan WA, Tedja HS, Stephanie. 2020. Ramularia mali strains isolated from petroleum product-contaminated soil are capable to grow on multiple aromatic compounds.
Biodiversitas Journal of Biological Diversity 21(8):3590-3595. https://doi.org/10.13057/biodiv/d210823</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Industrial Management</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th semester</td></tr>
<tr><td>Person responsible for the course</td><td>Herlin Hidayat, S.E., M.M.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 313</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand, analyze, evaluate, and build business operations</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
In this course, students will learn to explore and understand technology as corporate resources – a resource that allows a firm to keep innovating. It will show how firms can use technology to design and develop products and services that maximize customer satisfaction on one side, while maximizing corporate productivity, profitability, and competitiveness on the other side. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
</table>

<table>
<tr><td>Study and examination requirements</td><td>Rating Weight:

<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>15%</td></tr><tr><td>Assignment/Quiz 2</td><td>15%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Barlow, John F., 2005, Excel Models for Business and Operations Management, 2nd edition, Sussex, England: John Wiley and Sons
Dornfeld, David A. (ed)., 2013. Green Manufacturing: Fundamentals and Applications, NY: Springer
Heizer, J. & Render, B. Munson, C., 2020. Operation Management: Sustainabilityand Supply Chain Management, 13 th Edition, NY: Pearson
Luo Zongwei, 2014, Smart Manufacturing Innovation and Transformation: Interconnection and Intelligence, PA: Business Science Reference
Onetti, Alberto & Zucchella, Antonella, 2014., Business Modeling for Life Science and Biotech Companies: Creating Value and Competitive Advantage with The Milestone Bridge, NY: Routledge
Shimasaki, Craig D.,2009. The Business of Bioscience: What Goes into Making a Biotechnology Product, NY: Springer. Operation Management, Krajewski, 6th edition, prentice hall, 2002.</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Molecular Diagnostics</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>5th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Prof. Dr Diana E Waturangi</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 315</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand various techniques for DNA profile analysis, such as RFLP, AFLP, RAPD, microsatellite, PFGE, etc.
2. Students are able to implement various molecular diagnostic techniques in different fields (food, medic, agriculture, environment, and forensic)</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Molecular Diagnostics provides knowledge about phenotypic traits and genotype that can be used as basis for molecular diagnostics based on a variety of DNA sequences (restriction endonuclease, nucleic acid hybridization, Polymerase Chain Reaction, and Pulsed Filed Gel Electrophoresis), which is associated with various techniques for DNA profiling, such as RAPD, RFLP, AFLP, MFLP, ribotyping and Schizotyping. In this course, the development of the use of reporter gene (green fluorescent protein, ice nucleation gene, and bioluminescence) in molecular diagnostics and molecular diagnostic applications in various fields will also be discussed. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>30%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>-</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Plant Biotechnology and Sustainable Agriculture</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>6th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Listya Utami Karmawan</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 304</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to apply the basic theories of plant biotechnology
2. Students are able to analyze different applications of plant biotechnology aimed to improve human welfare
3. Students are able to evaluate the principles and technique practices of plant biotechnology in the laboratorium</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
In Plant Biotechnology Course, students will be introduced to the application of the principles of molecular biology, DNA technology, and plant tissue culture that have been studied in the previous semester in plant breeding. The application includes mapping plant genes, using molecular markers in plant breeding, and making transgenic plants. In addition, students will also be provided with insight into the fundamentals of plant biotechnology, genetic engineering techniques and plant transformation, isolation of genes</td></tr>
</table>

<table>
<tr><td></td><td>related to biotic and abiotic stresses, application of plant biotechnology, and the development of GMOs in agriculture in today's world. This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment 1</td><td>15%</td></tr><tr><td>Practicum</td><td>35%</td></tr><tr><td>Final Exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Main:
Acquaah, G. (2012). Principles of Plant Genetics and Breeding. Retrieved from https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=207325 https://books.google.co.id/books?id=Si-qaSeNcPIC
Chrispeels, M. J., Sadava, D. E., & Chrispeels, M. J. (2003). Plants, genes, and crop biotechnology. Boston: Jones and Bartlett Publisher. https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=38662
Snustad, D. P. (2003). Principles of genetics. New York: Wiley. https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=252338
Support:
Abdin, M. Z., Kiran, U., & Ali, A. (2017). Plant Biotechnology: Principles and Applications. Retrieved from https://books.google.co.id/books?id=8z5RDgAAQBAJ ; https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=252333
Griffiths, A. J. F. (2015). Introduction to genetic analysis. New York: W.H. Freeman. https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=207326
Jones, P., & Sutton, J. M. (1997). Plant molecular biology: essential techniques. Chichester; New York: J. Wiley. https://lib.atmajaya.ac.id/default.aspx?tabID=61&src=k&id=207850
Paterson, A. H. (1996). Genome mapping in plants. San Diego, Calif.; Landes: Austin, Texas: Academic Press ;</td></tr>
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	Slater, A., Scott, N., & Fowler, M. (2003). Plant biotechnology: the genetic manipulation of plants.

<table>
<tr><td>Course designation</td><td><u>Bioreactor Engineering</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>6th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Eng. Hans Wijaya, M.T</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 308</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to classify bioreactor types and able to describe the specificity of each type in designing of metabolite production
2. Students are able to explain the concept and calculate energy and material balance equations in bioreactors
3. Students are able to design types of bioreactors and their metabolite production scheme from microorganism from raw materials to final products on an industrial scale</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course introduces the production process using bioreactors from upstream to downstream, which includes types of bioreactors, types of fermentation in large-scale bioreactors, chemical processes in the conversion of substrates into products, and kinetic calculation. The application and design of bioreactors in industrial-scale production in various fields, such as food, medical, environmental, and energy fields, are presented in the form of presentations and group discussions. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>40%</td></tr><tr><td>Assignment 1</td><td>20%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>-</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Molecular Biology of Prokaryotic Diversity</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>6th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Prof. Dr. Diana E Waturangi</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
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<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (2-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 312</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the more advanced diversity in prokaryotes
2. Students are able to explain various ways of living in microorganisms from molecular aspects
3. Students are able to describe the application of various microbe metabolites in various fields</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course discusses the diversity of prokaryotes, such as bacteria and archaea that have extreme way of life or microbes that have unique metabolisms, for example, methanogens, ice crystal-forming bacteria, or bioluminescent bacteria, at the molecular level. This course consists of 2 credits of lectures and 1 credit of practicum</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☐ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>30%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Waturangi 2022. Mikroorganisme dan aplikasinya dalam berbagai industri. Gramedia.
Madigan et al., 2014. Biologi of Microorganism. 14th Ed. Prentice Hall. Pearson Education, Inc.
Rochelle, P. A. 2001. Environmental Molecular Microbiology: Protocols and Application. Wymondham: Horizon Scientific Press.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Scientific Writing and Presentation Skills</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>6th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Daru Seto Bagus Anugrah, S.Si., M.Eng.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
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<tr><td>Credit points</td><td>Credits: 3 (3-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 314</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to apply the basics of writing scientific papers
2. Students are able to create and evaluate a scientific paper
3. Students are able to demonstate oral presentation
4. Students are able to categorize intellectual property rights</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course covers the anatomy and ethics of scientific writing, oral presentation of research papers, and intellectual property rights. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>✓ Written test
✓ Oral test
✓ Performance test (practical)
✓ Assignments (papers, projects, portofolios, products)</td></tr>
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<tr>
<td>Study and examination requirements</td>
<td>Rating Weight:
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<tr><td>Midterm (written)</td><td>15%</td></tr>
<tr><td>Assignment 1 (Article review)</td><td>20%</td></tr>
<tr><td>Assignment 2 (PKM Scientific paper)</td><td>30%</td></tr>
<tr><td>Assignment 3 (Oral presentation)</td><td>20%</td></tr>
<tr><td>Final Exam (written)</td><td>15%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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</td>
</tr>
<tr>
<td>Reading list</td>
<td>Diao AL, Gunawan AW, Aruan DA, Kusuma S, Adriyanto S. 2014. Literasi Informasi: 7 Langkah Knowledge Management. Jakarta (ID): Universitas Atma Jaya Pr.
Pedoman Program Kreativitas Mahasiswa, Ed. 2020.
Informasi dari Direktorat Jenderal Hak Kekayaan Intelektual, Kementrian Hukum dan Hak Asasi Manusia Republik Indonesia.
Speaking to inform: Discussing complex ideas with clear explanations and dynamic slides, University of Washington, https://www.coursera.org/learn/inform-speech
Anugrah, et al, 2023, “Utilising N-glutaryl chitosan-based film with butterfly pea flower anthocyanin as a freshness indicator of chicken breast”, Packaging Technology and Science, Wiley
Anugrah, et al, 2023, “Development of alginate-based film incorporated with anthocyanins of red cabbage and zinc oxide nanoparticles as freshness indicator for prawns”, International Journal of Biological Macromolecules, Elsevier</td>
</tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Entrepreneurship</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>6th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Benedicta Evienia Prabawanti, S.E., M.M</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 316</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to identify business opportunities and apply creative ideas that have a positive social impact and bring profits
2. Students are able to understand and explain business concepts in a frame of mind and implement them into a strategy
3. Students are able to explain financial management and socialize simple financial management to the environment</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course contains entrepreneurial concepts ranging from the process of birth of a business idea to the establishment of a new business, and its management, as well as business development.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>20%</td></tr><tr><td>Assignment/Quiz 2</td><td>20%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Bernardi, P.D., Azucar, D., 2020. Innovation in Food Ecosystem: Entrepreneurship for a sustainable future. Springer.
Scarborough, N.M, Cornwall, Jeffrey R., 2019., Essentials of Entrepreneurship and Small Business Management. Pearson.
Pride, W.M., Hughes, R.J.,Kapoor, J.R., 2018. Foundation of Business. Cengage.
Stafford, B.N., 1991. From Kitchen to Consumer: The Entrepreneur’s Guide to Commercial Food Production. Academic Press, Inc.
Diderich, C., 2019. Design Thinking for Strategy Innovating Towards Competitive Advantage. Springer
Osterwalder, A., Pigneur, Y., 2014., Value Proposition Design. Wiley.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>High-Technology Product Marketing</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>6th Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ari Setiyaningrum, SE., M.Si.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 318</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand the stages of developing a business idea systematically
2. Students are able to analyze the market and industry with SWOT
3. Students are able to determine the developed business model and able to decide the target market
4. Students are able to understand about brand and the positioning and development of a brand
5. Students are able to understand consumer behaviour</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course provides students with knowledge and skills related to the marketing aspects of high-technology products so that the products can be applied according to the fields of study in biotechnology and food technology. This knowledge and skills help students to be able to work in a company or be self-employed. This course consists of 3 credits of lectures</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>20%</td></tr><tr><td>Assignment 1</td><td>10%</td></tr><tr><td>Group Project Presentation (Midterm)</td><td>35%</td></tr><tr><td>Group Project Presentation (Final)</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Kotler, Philip. & Armstrong, Garry. (2018). Principles of Marketing. 17th Edition. Harlow England: Pearson Education International.
Kotler, Philip & Keller, Kevin Lane. (2016). Marketing Management. 15th Edition. New Jersey: Pearson Global Edition.
Setiyaningrum, Ari, Udaya, Jusuf, & Efendi, Efendi. (2016). Prinsip-Prinsip Pemasaran Plus Tren Terkini Pemasaran Global, Pemasaran Jasa, Green Marketing, Entrepreneurial Marketing, E-Marketing. Yogyakarta: Penerbit Andi.
Cases about biotechnology product marketing from internet reference.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Field Training</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd/Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Renna Eliana Warjoto, M.Sc.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Field work</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Field work</td><td>4 * 170 min</td><td>7 to 21</td><td>79,1 hour to 238 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 4</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 400</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to be familiar with the working world and begin to develop a good work ethic with their involvement in work activities in institutions or companies
2. Students are able to analyze the given task and problems encountered in institutions or companies based on scientific principles for real-world applications</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Students must have completed a minimum study load of 100 credits with a cumulative grade point average (GPA) of 2.00 before taking the Field Practice course. In this course, students do internship at an institution outside Atma Jaya Catholic University of Indonesia to interact with the institution they choose and gain work experience at the institution. Students observe, recognize, and analyze problems found during the field practice. The scope of activities must be related to either biology, food, biotechnology, or industry. Students will be supervised by a lecturer of the Faculty of Biotechnology and a</td></tr>
</table>

<table>
<tr><td></td><td>supervisor from institutions in the field. This course consists of 4 credits of field work/training.</td></tr>
<tr><td>Examination forms</td><td>☐ Written test
✓ Oral test
✓ Performance test (practical)
✓ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm (evaluation by supervisor from the institution or company)</td><td>40%</td></tr><tr><td>Assignment 1 (presentation)</td><td>15%</td></tr><tr><td>Assignment 2 (report)</td><td>15%</td></tr><tr><td>Final exam (evaluation from advisor from university from the presentation)</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Gunawan AW, Lestari D, Magdalena S, Barus T. 2019. Panduan Penulisan Karya Ilmiah Fakultas Teknobiologi (Rev3). Jakarta (ID): Universitas Katolik Indonesia Atma Jaya.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Special Topics for Preliminary Biotechnology Research</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd/Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Meda Canti, S.T.P., M.Sc.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>3 * 170 min</td><td>16</td><td>136 hour</td></tr>
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*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 3 (0-3)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 450</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to create research proposal with clear foundation and objectives
2. Students are able to analyze and correlate the literature with the intended research
3. Students are able to understand appropriate research ethics</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course describes the procedures for drafting proposals in accordance with the rules of scientific writing by utilizing supporting applications. Ethics in conducting research, how to obtain valid and reliable literature sources, and literature studies from various journals are also discussed to support the preparation of research proposals. This proposal is the final result of this course and is used as a basis for conducting research in the final project. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>40%</td></tr><tr><td>Final Exam</td><td>60%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>[CSE] Council of Science Editors, Style Manual Committee. 2006. Scientific style and format: the CSE manual for authors, editors, and Publishers. Ed ke-7. Reston (US): CSE.
Article from accreditate journal / non accreditate reputation national/ international
Guide book scientific writing faculty of biotechnology
https://www.atmajaya.ac.id/id/pages/2023-buku-panduan-penulisan-ta-ftb/</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Seminar</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd/Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dionysius Subali, M.Biotek.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Seminar</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Seminar</td><td>1 * 170 min</td><td>-</td><td>-</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 1 (0-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 490</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to analyze research data and present it in the form of tables or graphs
2. Students are able to assemble seminar papers based on the result of their research progress
3. Students are able to present the hypothesis, methodology, result, and discussion of their research and able to answer the questions from the audience regarding their research</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The seminar is the presentation of the results of research in the final project to the public. Each seminar presenter must complete a minimum of 50-70% research in final project, write a seminar paper, and present the results in a forum attended by at least 15 people. The seminar is attended by the final project advisor and a seminar moderator. Assessments are carried out by advisor and moderator based on paper writing, presentation, and the ability to answer questions on the forum. This course consists of 1 credit of seminar.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☐ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Supervisor assessment</td><td>50%</td></tr><tr><td>Moderator assessment</td><td>50%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Gunawan AW, Lestari D, Magdalena S, Barus T. 2018. Panduan Penulisan Karya Ilmiah Fakultas Teknobiologi. Jakarta: Unika Atma Jaya.
All reference primer trusted from 10 years ago</td></tr>
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<table>
<tr><td>Course designation</td><td><u>Final Project</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd/Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Yasinta Ratna Esti Wulandari, M.Si</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Thesis Defence</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Thesis Defence</td><td>6 * 170 min</td><td>-</td><td>-</td></tr>
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</td></tr>
<tr><td>Credit points</td><td>Credits: 6</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIO 500</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to analyze research data and present it in the form of tables or graphics
2. Students are able to assemble thesis
3. Students are able to present the hypothesis, methodology, result, and discussion of their research and able to answer the questions from the examiners</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The learning process of 8 semesters, which includes lectures, practicum, field practice, seminar, and final research project has been done well. In this course, students will be tested comprehensively on their knowledge of biotechnology and relevant aspects of biotechnology, as well as the process and results of their research that has been completed as a prerequisite for the final project trial. Students need to report the result of the research in the form of a thesis and present it while being accountable for the result of the research and the learning in Biotechnology study program in the final trial in front of a team of examiners, consisting of supervisors, outside examiners, and trial secretaries.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☐ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Head examiner (supervisor I)</td><td>25%</td></tr><tr><td>Examiner I (outside examiner)</td><td>40%</td></tr><tr><td>Examiner II (supervisor II)</td><td>25%</td></tr><tr><td>Examiner III (secretary)</td><td>10%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Gunawan AW, Lestari D, Magdalena S, Barus T. 2018. Panduan Penulisan Karya Ilmiah Fakultas Teknobiologi. Jakarta: Unika Atma Jaya.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Industrial Product Safety Control</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Meda Canti, S.T.P., M.Sc.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 474</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain food product safety issues, and the definitions, principles, and benefits of Hazard Analysis and Critical Control Points (HACCP) system, and provide examples of HACCP system applications in the food industry
2. Students are able to think creatively and sufficiently through group projects and able to implement the application of food security management and HACCP system in the entire food chain in the food industry</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Industrial Product Safety Control course will provide students with comprehensive knowledge about food product safety issues, definitions, principles, and benefits of industrial product safety control, and HACCP system and provides examples of HACCP system applications in the food industry. In addition, this course also provides an understanding of ISO 9000: 2008, which specifies requirements for a quality management system, and ISO 22000: 2005, which specifies requirements for a food safety management system covering all organizations working in the food chain. This course requires students to do self-</td></tr>
</table>

<table>
<tr><td></td><td>learning through group presentation assignment and to make papers on ISO and HACCP applications in the food industry. This is to train students to increase knowledge and insight about the application of food safety management systems and HACCP in the entire food chain in the food industry. This course consists of 3 credits of lectures.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>30%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Anonim. 2018. ISO 22000:2018 Food Safety Management Systems Requirements for any Organization in The Food Chain. Switzerland.
Anonim. 2015. SNI ISO 9001:2015 Quality Management Systems. Badan Standardisasi Nasional. Jakarta.
Anonim. 2018. ISO 31000:2018 Risk Management, Principles and guidelines. Switzerland.
McElhatton, A. and Marshall, R. J. 2007. Food Safety : A Practical and Case Study Approach. Springer. London.
Mortimore, S. and Wallace, C. 2001. Food Industry Briefing Series : HACCP. Blackwell Science Ltd. USA.
Paster, T. 2007. The HACCP Food Safety Training Manual. John Wiley and Sons, Inc. Canada.

Journal about food safety and quality control</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Bioenergy Principles and Applications</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Renna Eliana Warjoto, M.Sc.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP458</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain the concept of bioenergy, the principle of sustainability, biorefinery, biomass conversion, and Bioelectrochemical Systems. (S6, KK1, KK3, KK4, P3, P5, P6, P9)
2. Students are able to explain research and prospects of the bioenergy industry using various microorganisms. (KU1, KK1, P5, P6)
3. Students are able to study bioenergy products and their latest applications. (S6, KU1, KK1, KK4, P3, P5, P6, P9)
4. Students are able to apply logical, critical, and systematic thinking regarding the relationship between bioenergy and other sectors in the form of opinion articles and roleplay. (S6, KU8, KK3, KK4, P9)
5. Students are able to pour knowledge, understanding, creativity, and innovative ideas related to bioenergy in the form of mini project proposals (PKM-GT or PKM-PE) and present them. (S6, KU1, KU8, KK1, KK3, KK4, P3, P5, P6, P9)</td></tr>
</table>

<table>
<tr><td>Content</td><td><u>Course Description:</u>
This elective course is intended for all students of the Biology Study Program. This course introduces the concept of bioenergy, biorefinery, the principle of sustainability, as well as the latest research, prospects, and applications of bioenergy products as part of modern biotechnology. Discussions about the relationship between bioenergy and the economic and political sectors are also part of this course. In addition to opening insights, this course can also train students' creativity and critical thinking related to topics through discussions, opinion writing assignments, and the preparation of mini project proposals (PKM-GT or PKM-PE).</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment (Opinion & Roleplay Article)</td><td>20%</td></tr><tr><td>Assignment (Presentation)</td><td>20%</td></tr><tr><td>Final exam (Proposal Mini Project)</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Energy Research: Advances and Applications. 1st Edition. 2014. Editors: Gupta VK, Kubicek CP, Saddler J, Xu F, Tuohy MG. Elsevier.
Biorefineries. 2010. Demirbas A. Springer-Verlag London Limited.
Microbial Fuel Cells. 2008. Logan BE. John Wiley & Sons, Inc.
Downstream Processing in Biotechnology. 2013. Wesselingh JA, Krijgsman J. Delft Academic Press.
Scientific article</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Food Technology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Widya Agustinah, M.Sc.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 463</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to explain to concept of science, technology and biotechnology of food (history, definition, standardization, and food regulation) as well as food components and their physicochemical changes
2. Students are able to classify food processing and preservation technologies and able to determine their analysis (heat transfer, thermal process, commercial sterilization, canning, drying, molecular gastronomy, chocolate, coffee, and tea processing, food additives, and proximate analysis)
3. Students are able to determine the appropriate packing methods, types of damage to the packaging, and safety parameters for fresh and processed food</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Food Technology Course will provide students with comprehensive knowledge about the fundamentals of food technology, which includes the introduction of physical and chemical properties, food microbiology, food quality assessment, technologies for food processing preservation, and food product</td></tr>
</table>

<table>
<tr><td></td><td>packaging. This course applies a two-way approach, namely, lecture and practicum, which require students to do self-learning through a package of assignments decided by the lecturer regarding the development of small-scale food industry. The package requires students to be divided into groups of 5-6 students so that they are able to learn independently to obtain the necessary data, such as data on how to produce, package and label products and market them. Thus, they can put into practice the theory they have obtained in class as practical material in the assignment package. The assignment will be presented both orally and in writing (in the form of posters and presentations). At the end of the practicum course, there will be an exhibition of innovative food products that have been created by students in a food festival. In its implementation, the lecturer, who is assisted by teaching assistant, will supervise the entire group of students. This course consists of 2 credits of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>30%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Lee YK. 2004. Microbial Biotechology. Singapore: World Scientific Publishing Co. Pte. Ltd.
Winarno FG. 2007. Teknobiologi Pangan. Bogor: M-BRIO Press.
Winarno FG. 2004. Kimia Pangan dan Gizi. Jakarta: Gramedia Pustaka Utama.
Winarno FG, Fernandez IE. 2007. Susu dan Produk Fermentasinya. Bogor: MBRIO Press.
Winarno FG, Agustinah W. 2007. Pengantar Bioteknologi. Ed rev. Bogor: MBRIO Press.
Winarno FG, Agustinah W. 2005. Herba dan Rempah: Aplikasinya dalam Hidangan. Bogor: M-BRIO Press.
Winarno FG, Agustinah W, Barus T. 2009. Penuntun Praktis Usaha Mandiri Teknobiologi Pangan. Jakarta: Penerbit Universitas Atma Jaya.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Virology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yulia Tanti Narwati, S.Si., M.Si.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 467</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to be explain the related principles of virology
2. Students are able to classify the different classes of viruses and their pathogenesis
3. Students are able to know and able to perform viral diagnostic
4. Students are able to apply biosafety measures</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course provides further insights to students about viruses, the benefits that can be taken and the harm they cause. In addition, students will learn about the latest technology in virological tests, antiviral drugs, and vaccines. At the end of this course, students can benefit by combining biotechnology with virology to produce reliable diagnostics and therapeutic produts. This course consists of 3 credits of lectures.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>40%</td></tr><tr><td>Final exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Goldsby RA, Kindt TJ and Osborne BA. 2000. Kuby’s Immunology. 4th Edition.
Mims C, Nash A and Stephen J. (2001). Mim’s Pathogenesis of Infectious Disease. 5th Ed
Nathanson N (2002). Viral Pathogenesis and Immunity. 2nd Ed
WHO (2004). Laboratory Biosafety Manual. 3rd Ed
Flint, et al (2004) Principles of Virology, 2nd Ed.
Wagner and Hewlett (2004) Basic virology, 2nd Ed.
Hirsh DC, MacLachlan NJ and Walker RL. (2004). Veterinary Microbiology. 2nd
Fleming DO and Hunt DL (2006). Biological Safety; Priciples and Practices. 4th Ed
Carter J and Saunders V. (2007). Virology.
Ed.Strauss JH and Strauss EG. (2008). Viruses and Human Disease., 2nd Ed.
Murphy K, travers p and Walport M (2008). Janeway’s Immunobiology. 7th Ed
Voevodin AF and Marx Jr. PA. (2009). Simian Virology
MacLachlan and Dubovi (2011). Fenner’s Veterinary Virology. 4th Ed.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Food Product Development Laboratory</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Widya Agustinah, M.Sc</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Practicum</td><td>2 *170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (0-2)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 466</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to apply food technology in the manufacture of various technological food products (fermentation, dry food, emulsions, encapssulations, candies)
2. Students are able to determine food quality with various lab tools and sensory evaluation methods
3. Students are able to develop and produce innovative food (group projects) to be exhibited in the Food Festival</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The Food Product Development Lab course consists of response and practicum activities at the Food Processing Laboratory. This elective course is an application of the theories and concepts that have been or are being studied in the Food Technology course. Various practicum activities, such as the manufacture of food fermentation products, dry food, emulsions, encapsulation, candy, and sensory evaluation as well as analysis of various food quality parameters will be facilitated in this course. Students in the group are also required to carry out project-based learning through an independent task package for the development of small industrial food products</td></tr>
</table>

<table>
<tr><td></td><td>with a theme that has been determined by the lecturer. The independent task requires students in groups of 5-6 people to be able to learn independently to obtain the necessary data, such as how to optimize the processing process of innovative food products, produce, package, and label and market them. The independent assignment will be presented, both orally and in writing (in the form of a poster) in the peak event in the form of an exhibition of innovative food products (Food Festival) organized by students. In its implementation, lecturers will guide all student groups assisted by student assistants.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>10%</td></tr><tr><td>Assignment/Quiz 1</td><td>30%</td></tr><tr><td>Assignment/Quiz 2</td><td>25%</td></tr><tr><td>Assignment/Quiz 3</td><td>25%</td></tr><tr><td>Final Exam</td><td>10%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Lee YK. 2004. Microbial Biotechology. Singapore: World Scientific Publishing Co. Pte. Ltd.
Winarno FG. 2007. Teknobiologi Pangan. Bogor: M-BRIO Press.
Winarno FG. 2004. Kimia Pangan dan Gizi. Jakarta: Gramedia Pustaka Utama.
Winarno FG, Fernandez IE. 2007. Susu dan Produk Fermentasinya. Bogor: M-BRIO Press.
Winarno FG, Agustinah W. 2007. Pengantar Bioteknologi. Ed rev. Bogor: M-BRIO Press.
Winarno FG, Agustinah W. 2005. Herba dan Rempah: Aplikasinya dalam Hidangan. Bogor: M-BRIO Press.
Winarno FG, Agustinah W, Barus T. 2009. Penuntun Praktis Usaha Mandiri Teknobiologi Pangan. Jakarta: Penerbit Universitas Atma Jaya</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Principles of Animal Biotechnology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Tresnawati Purwadaria</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2* 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 473</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Explain the use of biotechnology processes and products as feed ingredients for livestock production
2. Explain the role of biotechnology in regulating the livestock reproductive system to increase livestock production
3. Explain the application of molecular diagnostic techniques to livestock breeding and seed preparation
4. Outline the stages of gene mapping applied to the improvement of GMO animals/livestock</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This lecture explains the application of biotechnology in the field of livestock production including: (i) feed biotechnology, namely the benefits of feed supplemented by bioprocessed products (antibiotics, enzymes, and probiotics) on livestock performance, silage production, and the application of bioprocessing to improve feed quality from plantation waste, and the integration of livestock in plantations, (ii) reproductive biotechnology, namely hormone regulation in livestock production, artificial insemination, sperm preservation, and</td></tr>
</table>

<table>
<tr><td></td><td>embryo transfer technology; (iii) livestock breeding biotechnology, namely conventional livestock breeding techniques, useful gene mapping, application of genetic assistance markers, and transgenic animals</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment 1</td><td>15%</td></tr><tr><td>Assignment 2</td><td>15%</td></tr><tr><td>Final Exam</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>-</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Animal Cell Culture</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yanti (PhD)</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (1-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 475</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to be identify regarding animal cell biology, environmental conditions for animal cell culture growth, aseptic techniques, and handling contaminations
2. Students are able to explain types of animal cell culture, proliferations, and transformations, and their application in the medical field
3. Students are able to apply aseptic techniques, how to make animal cell culture media and nutrition media, cell visualization techniques, how to quantify cells, sub-culture techniques, cryopreservation, and thawing of animal cell cultures
4. Students are able to practice on how to isolate primary explants from chicken eggs, test the cytotoxicity of animal cells against sample treatments, and test the efficacy of bioactive compounds with animal cell culture models</td></tr>
<tr><td>Content</td><td><u>Course Description:</u></td></tr>
</table>

<table>
<tr><td></td><td>In this course, students will be introduced to the theoretical and practical concepts of animal cell culture. First, students can identify and explain the biology of animal cells, followed by the environmental conditions to grow, aseptic techniques, and handling contamination. Students also learn types of animal cell culture, proliferation, and transformation. Students need to understand the application of animal cell culture in the medical field, such as the production of monoclonal antibodies, recombinant proteins, stem cells and their case studies. Students also need to know the application of animal cell culture in medical and pharmaceutical industries. In practicum, students will learn about aseptic techniques and how to make animal cell culture media and nutrition media, cell visualization techniques, how to quantify cells, sub-culture techniques, cryopreservation, and thawing of animal cell cultures. Finally, students will also practice on how to isolate primary explants from chicken eggs, test the cytotoxicity of animal cells against sample treatments, and test the efficacy of bioactive compounds with animal cell culture models. This course consists of 1 credit of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>✓ Written test
☐ Oral test
✓ Performance test (practical)
✓ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Assignment/Quiz 2</td><td>40%</td></tr><tr><td>Final exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Recent journal article (National and international) about recent research animal cell culture and stem cell</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Capita Selecta in Biotechnology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yanti, Ph.D.</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 476</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Understand the latest concepts and developments in biotechnology.
2. Analyze the application of biotechnology in various industrial and health sectors.
3. Develop critical thinking on biotechnology issues.
4. Proposing innovative biotechnology-based solutions to global challenges.</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This course discusses selected topics in biotechnology that are current and applicable, including aspects of the latest research, technological innovation, and the application of biotechnology in various industries. Students will be provided with insight into global and local trends in biotechnology and their impact on human life.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>
<table>
<tr><td>✓</td><td>Written test</td></tr>
<tr><td>✓</td><td>Oral test</td></tr>
<tr><td></td><td>Performance test (practical)</td></tr>
<tr><td>✓</td><td>Assignments (papers, projects, portofolios, products)</td></tr>
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</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
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<tr><td>Midterm</td><td>20%</td></tr>
<tr><td>Class Participation</td><td>10%</td></tr>
<tr><td>Assignment/Quiz</td><td>20%</td></tr>
<tr><td>Project & Report</td><td>30%</td></tr>
<tr><td>Final exam</td><td>20%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>-</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Traditional Food Fermentation Technology</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ir. Tati Barus, MSi</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 479</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students can explain relationship between quality Fermented foods consumed with health
2. Students can explain the history of tempeh as a typical Indonesian fermented food
3. Students can explain the variety and technology of fermented foods Indonesia with its problems (food quality and safety)
4. Students can explain the advantages of fermented foods
5. Students can explain the role of microbes in food fermentation
6. Students can explain the application of molecular engineering in the analysis of food microbes</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
Students can explain about: 1. The concept of fermented food; 2. Variety and process of making Indonesian fermented food; 3. The important role of fermented foods in health; 3. Advantages of fermented food; 4.Tempeh as a commodity of local wisdom and its uniqueness compared to various types of fermented soybean foods in Asia</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>
☑ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
</td></tr>
<tr><td>Study and examination requirements</td><td>
Rating Weight:
<table>
<tr><td>Midterm</td><td>35%</td></tr>
<tr><td>Assignment/Quiz 1</td><td>10%</td></tr>
<tr><td>Assignment/Quiz 2</td><td>10%</td></tr>
<tr><td>Assignment/Quiz 3</td><td>10%</td></tr>
<tr><td>Final exam</td><td>35%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Reading list</td><td>
You Are What You Eat Cookbook. Dr Gillian McKeith, 2007
Microbiology and Biotechnology. E.M.T. El-Mansi • C.F.A. Bryce • B. Dahhou S. Sanchez • A.L. Demain • A.R. Allman. 2012.
The essential book of fermentation: the great taste and good health. Jeff Cox. 2013
Fermented Milk and dairy products. M.J.R. Nout and Prabir K. Sarkar. 2015.
Tambah buku2 produk penerbit Indonesia ttg fermentasi
Research journal
</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Microbial Bioprospecting</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yogiara, Ph.D</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (1-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 482</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to understand and explain the importance of microbial diversity as a potencial source of bioactive compounds
2. Students are able to able to perform microbe isolation and able to perform screening of some bioactive compounds
3. Students are able to apply direct DNA isolation technique from environmental samples for genome library creation or microorganism diversity analysis
4. Students are able to apply microbial diversity analysis techniques
5. Students are able to apply genome library creation techniques
6. Students are able to understand recombinant DNA technology, such as error prone PCR, site directed mutagenesis, and DNA shuffling
7. Students are able to understand some international rules regarding bioprospecting to protect natural resources of a country</td></tr>
</table>

<table>
<tr><td>Content</td><td><u>Course Description:</u>
Bioprospecting stands for biodiversity prospecting. In bioprospecting, there are a series of activities that are aimed at finding and discovering new bioactive compounds through exploration of biodiversity. The development of the search for bioactive compounds from microbial origin has shifted from approach that depends on microbial culture to one that does not depend on culture. The search for bioactive materials via approach that does not depend on microbial culture is known as bioprospecting. This course will review the use of microbial diversity in metagenomic techniques and the application of bioinformatics for bioprospecting. This course consists of 1 credit of lectures and 1 credit of practicum.</td></tr>
<tr><td>Examination forms</td><td>☑ Written test
☐ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:
<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assigment/Quiz 1</td><td>30%</td></tr><tr><td>Assignment/Quiz 2</td><td>25%</td></tr><tr><td>Final Exam (Reflection)</td><td>20%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Sanders ER, Miller JH. 2010. I, Microbiologist A Discovery-Based Course in Microbial Ecology and Molecular Evolution. Washington DC: ASM Press. 438 hal.
Bull, AT (ed). 2004. Microbial Diversity and Bioprospecting. Washington DC: ASM Press. 496 hal.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Communication Science</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Watumesa A. Tan</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 485</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to use basic science communication skills (S3, S9, KU9, KK2, P6)
2. Students are able to create communication media (S3, S9, KU9, KK2, P6)</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The science community produces new data and discoveries at a rapid pace. To increase the role of science in the eyes of the public, scientists need to discuss complex scientific discoveries and concepts in a clear and relevant way for members of society. Often, students as future scientists acquire the ability to communicate in academic situations, where the people involved are mostly from the same field. Instead, they often have difficulty explaining their field of study and its benefits in a simple and easy-to-understand way. Through this course, students will try to bridge the academic community with people with different skill backgrounds.</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☐ Written test
☐ Oral test
✓ Performance test (practical)
✓ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>E-Learning Activities</td><td>30%</td></tr><tr><td>Weekly Reflection Videos</td><td>30%</td></tr><tr><td>Community Service Ad Blog Articles/Videos</td><td>40%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Simple Writer [Software]. Retrieved from http://www.xkcd.com/simplewriter/
Wisnubrata. 2017. Gemetar setelah minum kopi? Mungkin anda overdosis kafein [in Indonesian]. Retrieved from http://lifestyle.kompas.com/read/2017/09/05/061500420/gemetar-setelah-minum-kopi-mungkin-anda-overdosis-kafein
Yong, E. 2010. Gut bacteria in Japanese people borrowed sushi-digesting genes from ocean bacteria [Blog post]. Retrieved from http://blogs.discovermagazine.com/notrocketscience/2010/04/07/gut-bacteria-in-japanese-people-borrowed-sushi-digesting-genes-from-ocean-bacteria/#.WZ_0w_BXeEc
Other chosen popular scientific articles (assigned a week before each meeting).</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Functional Food and Nutraceuticals</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Yanti</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 468</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Students are able to master the theoretical concepts of current functional foods and nutraceuticals
2. Students are able to understand the regulatory aspects and health claims of functional foods and nutraceuticals in various countries, including Indonesia
3. Students are able to understand, explain, and provide interpretations of the application of functional foods and nutraceuticals in the prevention/prevention of various diseases related to cardiovascular, immune function, bone health, tumors, cognitive function, and gastritis in various case studies.
4. Students are able to understand and interpret the working mechanisms of various functional food ingredients.
5. Students are able to understand and. design product development and formulation of functional food ingredients.</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
In this course, students will be introduced to the concept of functional food and nutraceuticals, various regulations and health</td></tr>
</table>

<table>
<tr><td></td><td>claims related to functional food and nutraceuticals globally, including in Indonesia. Students will also be explained about the understanding of the application of functional food and nutraceuticals in the prevention of various diseases related to cardiovascular, immune function, bone health, tumors, cognitive function, and gastritis through a number of case studies from paper results. Students will also learn to understand the working mechanisms of a number of functional food ingredients. Students will also be taught about how to design product development and formulation of functional food ingredients.</td></tr>
<tr><td>Examination forms</td><td>✓ Written test
✓ Oral test
☐ Performance test (practical)
✓ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>25%</td></tr><tr><td>Assignment/Quiz 1</td><td>25%</td></tr><tr><td>Assignment/Quiz 2</td><td>25%</td></tr><tr><td>Final Exam</td><td>25%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Saarela M. 2016. Functional Foods, 2nd Edition: Concept to Product. England: Woodhead Publishing.
Dilip Ghosh D, Bagchi D, Konishi K. 2014. Clinical Aspects of Functional Foods and Nutraceuticals. London: CRC Press.</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>French</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Odd Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Dr. Ir. Rory A Hutagalung, DEA</td></tr>
<tr><td>Language</td><td>French and Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>2 * 170 min</td><td>16</td><td>90,7 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2(2-0)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 472</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
1. Able to mention verb conjugations and adjust to the subject according to the verb class and diagram conjugation patterns/formulas
2. Able to compose and exemplify sentences according to their elements, analyze verb conjugations, and answer questions according to the sentence in question
3. Able to mention verb values, exemplify verbs, and analyze changes according to subject, time or mode
4. Able to apply, exemplify, and analyze the principles of conjugation of sentence rules and verb changes in written or oral form</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
The French language course studies the structure and logic of the French language with a systematic and holistic approach directed at French language skills in the aspects of written understanding (compréhension écrite), oral understanding (compréhension orale), oral expression ability (orale), and written expression ability (expression écrite).</td></tr>
</table>

<table>
<tr><td>Examination forms</td><td>☑ Written test
☑ Oral test
☐ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)</td></tr>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>35%</td></tr><tr><td>Assignment/Quiz 1</td><td>10%</td></tr><tr><td>Task/Quiz 2 (Activeness)</td><td>20%</td></tr><tr><td>Final Exam</td><td>35%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>Hutagalung, R. A. 2004. Grammaire Française. Suatu Pendekatan Sistematik dan Holistik Gramedia Pustaka Utama, Jakarta
Hutagalung RA. 2013. Metode Praktis Belajar Bahasa Prancis. Gramedia Pustaka Utama, Jakarta 253 hal.
Sirejol, E. et P. Claude 1990. Grammaire Avec 450 Nouveaux Exercisies. CLE Int. Paris</td></tr>
</table>

<table>
<tr><td>Course designation</td><td><u>Protein Structure Modeling</u></td></tr>
<tr><td>Semester(s) in which the course is taught</td><td>Even Semester</td></tr>
<tr><td>Person responsible for the course</td><td>Adi Yulandi, S.Si, M.T</td></tr>
<tr><td>Language</td><td>Indonesian</td></tr>
<tr><td>Relation to curriculum</td><td>Elective Course</td></tr>
<tr><td>Teaching methods</td><td>Lecture, practicum</td></tr>
<tr><td>Workload</td><td>
<table>
<tr><th>Type</th><th>Minutes per week*</th><th>Weeks number</th><th>Total hour per semester</th></tr>
<tr><td>Lecture</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
<tr><td>Practicum</td><td>1 * 170 min</td><td>16</td><td>45,3 hour</td></tr>
</table>
*(Based on Article 19 paragraphs 1, 2, and 4 of Permendikbud No. 3 of 2020)
</td></tr>
<tr><td>Credit points</td><td>Credits: 2 (1-1)</td></tr>
<tr><td>Required and recommended prerequisites for joining the course</td><td>Code: BIP 484</td></tr>
<tr><td>Course objectives/intended learning outcomes</td><td><u>Course Learning Outcomes:</u>
After taking this course, students are able to understand computational protein modeling techniques and their usefulness in determining protein structure and drug design</td></tr>
<tr><td>Content</td><td><u>Course Description:</u>
This lecture discusses the basics of protein structure modeling techniques and their uses. The topics of discussion broadly include structure data acquisition, secondary structure prediction, homology modeling, transmembrane proteins, threading, and docking as well as ligand design.</td></tr>
<tr><td>Examination forms</td><td>
☑ Written test
☐ Oral test
☑ Performance test (practical)
☑ Assignments (papers, projects, portofolios, products)
</td></tr>
</table>

<table>
<tr><td>Study and examination requirements</td><td>Rating Weight:<table><tr><td>Midterm</td><td>30%</td></tr><tr><td>Assignment/Quiz 1</td><td>15%</td></tr><tr><td>Assignment/Quiz 2</td><td>15%</td></tr><tr><td>Assignment/Quiz 3</td><td>10%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Reading list</td><td>-</td></tr>
</table>