

Course Module Magister Bioteknologi Program

Course Module 01

Module/Course Title: Cell Biology and Biomolecule					
Module course code	Student workload 3x50'	Credits 3 Sks	Semester 1	Frequency	Duration
1	Type of course Regular/Full Time		Contact hours	Independent study	Class size
2	Prerequisites for participation (if applicable)				
3	Learning outcomes <ul style="list-style-type: none"> ● Students can master and convey the basic concepts of genetic information flow in prokaryotes and eukaryotes ● Students can master and convey the basic concepts of cell biology 				
4	Subject aims/Content Cell biology and molecular biology courses aim to provide students with a strong basis for cell and molecular biology concepts as a provision for understanding advanced biotechnology.				
5	Teaching methods Encounter 1 – Genetic material, gene and chromosome in organisms Encounter 2 – DNA metabolisms, DNA replication in prokaryotic and eukaryotic organisms Encounter 3 – DNA mutation and recombination, DNA repair mechanism Encounter 4 – RNA metabolism, transcription in prokaryotic and eukaryotic organisms Encounter 5 – Protein metabolism, translation/protein biosynthesis in prokaryotic and eukaryotik Encounter 6 – Regulation of genes expression Encounter 7 – Molecular biology of viruses, example to discuss: Sars Cov2 MIDTERM EXAM 8 Encounter 9 – Cell division cycle and its control				

	<p>Encounter 10</p> <ul style="list-style-type: none"> - The mechanic of cell division
	<p>Encounter 11</p> <ul style="list-style-type: none"> - Cell communication
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Programme cell death (PCD)
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Tools in molecular biology
	<p>Encounter 14</p> <ul style="list-style-type: none"> - Germ cells and fertilization
	<p>Encounter 15</p> <ul style="list-style-type: none"> - Differentiated cells and maintainance of tissue
	<p><i>FINAL EXAMS 16</i></p>
6	<p>Assessment methods</p> <p>Encounter 1</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 2</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 3</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 4</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 5</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 6</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 7</p> <ul style="list-style-type: none"> - Student presentation
	<p><i>MIDTERM EXAM 8</i></p>
	<p>Encounter 9</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 10</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions

	<p>Encounter 11</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 14</p> <ul style="list-style-type: none"> - Take home assignment, reading and answering questions
	<p>Encounter 15</p>
	<p><i>FINAL EXAMS 16</i></p>
7	<p>This module/course is used in the following study programme/s as well</p> <p>Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Prof. Dr. Toto Subroto 2. Nono Carsono, PhD
9	<p>Other Information</p> <ul style="list-style-type: none"> ● Alberts B., Johnson A., Lewis J., Raff M., Roberts K., Walter P. Molecular Biology of the Cells, Fifth Edition, Garland Science, Taylor and Francis, UK, 2008 ● Lodish, Berke, Matsudaira, Kaiser, Krieger, Scott, Zipursky, Darnell, Molecular cell Biology, Fifth Edition ● Nelson D.L., Cox M.M. Principles of Biochemistry, Six Edition, W.H. Freeman and Company, NY, 2013

Course Module 02

Module/Course Title: Bioinformatics					
Module course code	Student workload	Credits	Semester	Frequency	Duration
	3x50'	3 (2-1) Sks	1		
1	Type of course		Contact hours	Independent study	Class size
	Regular/Full Time				
2	Prerequisites for participation (if applicable)				
3	Learning outcomes After following this course, students can use on-line tools and several software for DNA and protein analysis to study the design of oligonucleotide primers, determine and analyze the nucleotide sequences from the sequenced and store them, determine the level of nucleotide sequence homology, compare nucleotide sequences with data bases, analyze DNA mutations, identification of microbes using 16s/18s rDNA and creation of phylogenetic trees, mutation studies on protein structure and stability, modeling, dynamics and docking of protein molecules				
4	Subject aims/Content The bioinformatics course aims to learn and practice several online/offline tools for DNA and protein analysis which are very useful in biotechnology research.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - Introduction to bioinformatics. Definition and scope of bioinformatics, Database and online tools, Bioinformatics for DNA analysis 				
	Encounter 2 <ul style="list-style-type: none"> - Databases and NCBI Data models. NCBI database, Gisaid, definitions and terms in the database 				
	Encounter 3 <ul style="list-style-type: none"> - Sequence alignment. Understanding sequence alignment, Alignment of two sequences, Multiple sequence alignment, Program for sequence alignment 				
	Encounter 4 <ul style="list-style-type: none"> - DNASTar program. Edit sequence, Seqman, Megalign, Mapdraw 				
	Encounter 5 <ul style="list-style-type: none"> - Phylogenetic analysis. Use of 16s and 18s rRNA sequences for phylogenetic analysis 				
	Encounter 6				

	<ul style="list-style-type: none"> – Practice of phylogenetic analysis, creating of phylogenetic tree
	<p>Encounter 7</p> <ul style="list-style-type: none"> – PCR primer and probe design. The primer design strategy, the primer design using online tools: Primer3 Plus, the oligo explorer, NCBI.
	<p><i>MIDTERM EXAM 8</i></p>
	<p>Encounter 9</p> <ul style="list-style-type: none"> – Protein database and structural database. PDB database, Swiss Prot, Protein structure search, Homology modeling
	<p>Encounter 10</p> <ul style="list-style-type: none"> – Prediction and modeling of protein 3D structure
	<p>Encounter 11</p> <ul style="list-style-type: none"> – Practice of protein modelling using Swiss Prot
	<p>Encounter 12</p> <ul style="list-style-type: none"> – Homology modeling with discovery studio software
	<p>Encounter 13</p> <ul style="list-style-type: none"> – Docking. Use of autodock vina software for molecular docking
	<p>Encounter 14</p> <ul style="list-style-type: none"> – Molecular dynamics.
	<p>Encounter 15</p> <ul style="list-style-type: none"> – Practice of molecular docking and molecular dynamic
	<p><i>FINAL EXAMS 16</i></p>
6	<p>Assessment methods</p> <p>Encounter 1</p> <ul style="list-style-type: none"> – Report of practice surfing bioinformatics web server
	<p>Encounter 2</p> <ul style="list-style-type: none"> – Report of practice surfing DNA database: NCBI, Gisaid, find a sequence, Blast the sequences
	<p>Encounter 3</p> <ul style="list-style-type: none"> – Report of alignment sequence using T-coffee
	<p>Encounter 4</p> <ul style="list-style-type: none"> – Report of saving sequence to EditSeq, analyses with SeqMan on DNASTar

	<p>Encounter 5</p> <ul style="list-style-type: none"> – Report of Blast the X sequence, save and edit several sequence for construction of phylogenetic tree
	<p>Encounter 6</p> <ul style="list-style-type: none"> – Presentation of phylogenetic analysis
	<p>Encounter 7</p> <ul style="list-style-type: none"> – Report of the result of primers and probe for the X sequence by using primer3Plus, and NCBI.
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9</p> <ul style="list-style-type: none"> – Report of practice surfing protein database, PDB, Swiss Prot
	<p>Encounter 10</p> <ul style="list-style-type: none"> – Report of practice protein modelling
	<p>Encounter 11</p> <ul style="list-style-type: none"> – Presentation the modelling result
	<p>Encounter 12</p> <ul style="list-style-type: none"> – Report of practice discovery studio for modelling
	<p>Encounter 13</p> <ul style="list-style-type: none"> – Report of docking by using autodoc Vina software
	<p>Encounter 14</p> <ul style="list-style-type: none"> – Report of molecular dynamic practice
	<p>Encounter 15</p> <ul style="list-style-type: none"> – Presentation of docking and MD result
	<p>FINAL EXAMS 16</p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Dr. rer. Nat. Ir. Suseno Amien 2. Muhammad Yusuf., Ph.D
9	<p>Other Information</p> <ul style="list-style-type: none"> – Baxevanis, A.D. & Ouellette, B.F.F. (2001). Bioinformatics, a practical guide to the analysis of genes and proteins, Wiley-Interscience.

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| | <ul style="list-style-type: none">- Madigan, M.T., Martinko, J.M., and Parker, J. (2000). Biology of Microorganisms, Prentice Hall Inc, New Jersey- NCBI: www.ncbi.nlm.nih.gov- PDB: www.rscb.org |
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Course Module 03

Module/Course Title: Techniques in Biomolecular research					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNO20 203	3x50'	3 (2-1) SKS	1		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Students master and practice the techniques used in molecular biotechnology research				
4	Subject aims/Content In this course, the basic and modern techniques used in molecular biotechnology research are studied: isolation, purification of DNA and RNA, PCR (Polymerase Chain reaction) and its applications, DNA electrophoresis, DNA sequencing, Southern Blot and Northern Blot, cloning and expression of recombinant proteins, protein isolation and purification, SDS-PAGE, and bioassays.				
5	Teaching methods				
	Encounter 1 – DNA and RNA isolation techniques				
	Encounter 2 – PCR and application				
	Encounter 3 – DNA sequencing technology				
	Encounter 4 - Practice: DNA plasmid isolation, PCR and agarose electrophoresis				
	Encounter 5 – Application of qPCR for diagnosis				
	Encounter 6 – Practice: RNA isolation and qRT-PCR of virus RNA				
	Encounter 7 – Southern Blot and Northern Blot				
	MIDTERM EXAM 8				
	Encounter 9 – Recombinant DNA technology, gene cloning how to do and characterization				
	Encounter 10 – Recombinant DNA expression and production				
	Encounter 11				

	<ul style="list-style-type: none"> - Recombinant protein expression system
	Encounter 12 <ul style="list-style-type: none"> - Characterization of recombinant protein and purification, SDS-PAGE and Western Blot
	Encounter 13 <ul style="list-style-type: none"> - Practice: Western Blot
	Encounter 14 <ul style="list-style-type: none"> - Bioassay for analysis of recombinant protein
	Encounter 15 <ul style="list-style-type: none"> - Practice: ELISA
	FINAL EXAMS 16
6	Assessment methods Encounter 1 <ul style="list-style-type: none"> - Report on some methods to isolated DNA and RNA
	Encounter 2 <ul style="list-style-type: none"> - Take home assignment, surfing an article on PCR application
	Encounter 3 <ul style="list-style-type: none"> - Take home assignment, find an article about PCR-RFLP/PCR-SSCP/Multiplex PCR
	Encounter 4 <ul style="list-style-type: none"> - Report of practical work
	Encounter 5 <ul style="list-style-type: none"> - Take home assignment, find an article about application of qRT-PCR
	Encounter 6 <ul style="list-style-type: none"> - Report of practical work
	Encounter 7 <ul style="list-style-type: none"> - Take home assignment, find an article about Southern Blot and Northern Blot
	MIDTERM EXAM 8
	Encounter 9 <ul style="list-style-type: none"> - Take home assignment, answering question
	Encounter 10 <ul style="list-style-type: none"> - Take home assignment, find an article about protein recombinant expression
	Encounter 11

	<ul style="list-style-type: none"> - Take home assignment
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Take home assignment
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Report of practical work
	<p>Encounter 14</p> <ul style="list-style-type: none"> - Take home assignment
	<p>Encounter 15</p> <ul style="list-style-type: none"> - Report of practical work
	<p>FINAL EXAMS 16</p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Prof. Anni Melani Maskoen 2. Dr. Shabarni Gaffar
9	<p>Other Information:</p> <ol style="list-style-type: none"> 1. Newton, C.R. & Graham, A. 1997. PCR.. 2nd ed. BIOS Scientific Publisher Limited. New York. 2. Brewer, J.M. & Ashworth, R.B. 1979. Experimental Technique in Biochemistry, Prentice-Hall, Inc. New Jersey. 3. Sambrook, J., Fritsch, E.F. & Maniatis, T. 1989. Molecular Cloning. A Laboratory Manual. 2nd ed. 1-3. Cold Spring Harbor Laboratory Press. USA. 4. Glick and Pasternak, Molecular biotechnology 5. Gaffar, S., Bioteknologi Molekul, Widya Padjadjaran, 2012 6. Gaffar, S., Sistem Ekspresi Pichia pastoris, Unpad Press, 2011

Course Module 04

Module/Course Title: Phylosophy of Science					
Module course code	Student workload 2x50'	Credits 2 Sks	Semester 1	Frequency	Duration
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Students are able to develop ideas about the nature of the seeker of knowledge, the essence of ontology, the essence of seeking the epistemology of values and the function of axiology, concerning the similarities and differences between natural sciences and social sciences and the relationship between theoretical epistemology and methodology.				
4	Subject aims/Content Knowledge (science) as normatively guided knowledge (from God Almighty, Allah Subhanahu Wataala). The search or mastery of knowledge (the quest for knowledge). Humans are capable of knowing, reasoning, and the results of reasoning. History of the development of philosophy and science. The world of ratio and taste; effort versus destiny. Empirical science; science anatomy. Deductive and inductive reasoning. The relationship between philosophy, science, and methodology (methods and techniques). Similarities and differences between the natural sciences and the social-humanitarian sciences. Pioneering science (science) based on religion. The same topics developed from the brief syllabus above were discussed by the teaching team with students in several parallel groups/classes.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - Understanding and Scope of Philosophy of Science - Philosophy of Science (Ontology, Epistemology, and Axiology) - Demarcation (Separation Boundary) Between Science and Non-Science Encounter 2 The Emergence of Philosophical of Science (Classical Antiquity-Muslim Medieval Era-Scientific Revolution) <ul style="list-style-type: none"> - Classical Debates between Aristotle (384-322 BC) and Plato (428-348 BC) (ratio, abstract world, logic and empiricism) - Transmission of Greek intellectual tradition through Medieval Muslim Scholars (Ibn Sina (Avicennism), Ibn Rushd (Averroism), and Andalusian and Toledo Tradition) 				

- Thomas Aquinas and Nicholas Copernicus in the Debate between Religious Dogma (Catholic Church) and ScienceScientific Revolution – Renaissance (The Development of Scientific Methods in Understanding Nature)

Encounter 3

Logic and Empirism

- The Empiricist Tradition
- The Vienna Circle
- Central Ideas of Logical Positivism
- Problems and Changes
- On the Fall of Logical Empiricism

Encounter 4

Induction and confirmation

- The mother of all problems
- Induction, Deduction, Confirmation and Explanatory Inference
- The Ravens Problems
- Goodman’s New Riddle of Induction

Encounter 5

Popper: Conjecture and Refutation I

- Popper’s Unique Place in the Philosophy of Science
- Popper’s Theory of Science
- Objections to Popper on Falsification

Encounter 6

Popper: Conjecture and Refutation II

- Objections to Popper on Confirmation
- Further Comments on the Demarcation Problems

Encounter 7

Kuhn and Normal Science

- “The Paradigm Has Shifted”
- Paradigms: A Closer Look
- Normal Science
- Anomaly and Crisis
- Wrap-up of Normal Science

	MIDTERM EXAM 8
	Encounter 9 Kuhn and Revolutions <ul style="list-style-type: none"> - Considerable Upset - Revolutions and Their Aftermath - Incommensurability, Relativism, and Progress - The X-Rated “Chapter X” - Final Thoughts on Kuhn
	Encounter 10 Natural Science, Social Science and Humaniora with the reference book: <ul style="list-style-type: none"> - Peter Goodfrey-Smith, 2003, An Introduction to the Philosophy of Science: Theory and Reality, Chicago University Press (PGS) - James Ladyman, 2002, Understanding Philosophy of Science, Routledge (JL) - A.F. Chalmers, 1976, What is This Thing Called Science? Third Edition, Hackett Publishing Company (AFC) -
	Encounter 11 The Relationship of Science with Ideology, Religion, and Culture I <ul style="list-style-type: none"> - Relation of Science with Ideology - Relation of Science with Religion - Relationship between Science and Culture
	Encounter 12 The Relationship of Science with Ideology, Religion, and Culture II
	Encounter 13 Science and Scientific Responsibility (Class Discussion).
	Encounter 14 Science and Scientific Responsibility (Class Discussion).
	Encounter 15 Class discussion
	FINAL EXAMS 16
6	Assessment methods Encounter 1 <ul style="list-style-type: none"> - Paper/Report& Discussion
	Encounter 2

	– Paper/Report& Discussion
	Encounter 3 – Paper/Report& Discussion
	Encounter 4 – Paper/Report& Discussion
	Encounter 5 – Paper/Report& Discussion
	Encounter 6 – Paper/Report& Discussion
	Encounter 7 – Paper/Report& Discussion
	MIDTERM EXAM 8
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion
	Encounter 12 – Paper/Report& Discussion
	Encounter 13 – Paper/Report& Discussion
	Encounter 14 Paper/Report& Discussion
	Encounter 15 Paper/Report& Discussion
	FINAL EXAMS 16
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course 1. Prof. Dr. Ir. Mahfud Arifin., MS

	2. Dr. Rahmat Hidayat., S.Pt., M.Si
9	<p>Other Information</p> <p>Main Books</p> <p>Peter Goodfrey-Smith, 2003, An Introduction to the Philosophy of Science: Theory and Reality, Chicago University Press (PGS)</p> <p>James Ladyman, 2002, Understanding Philosophy of Science, Routledge (JL)</p> <p>A.F. Chalmers, 1976, What is This Thing Called Science? Third Edition, Hackett Publishing Company (AFC)</p> <p>The Relationship between Science and Religion</p> <p>Abdullah, Amin, 2003, “Etika Tauhidik sebagai Dasar Kesatuan Epistemologi Keilmuan Umum dan Agama (dari Paradigma Positivistik-Sekularistik ke arah Teoantroposentrik-Integralistik)”, dalam Jarot Wahyudi, M. Anas Amin, Mustofa (ed), Menyatukan Kembali Ilmu-ilmu Agama dan Umum: Upaya mempertemukan Epistemologi Islam dan Umum, Sunan Kalijaga Press, Yogyakarta.</p> <p>Al-Attas, Syed Muhammad Naquib, 1981, Islam dan Sekularisme, Pustaka, Bandung.</p> <p>_____, 1995, Islam dan Filsafat Sain, terj. Saiful Muzani, Mizan, Bandung.</p> <p>Al-Faruqi, Ismail Raji’, 1984, Islamisasi Pengetahuan, Pustaka Salman, Bandung.</p> <p>Anshari, Endang Saifuddin, 1987, Ilmu Filsafat dan Agama, PT Bina Ilmu, Surabaya.</p> <p>Bagir, Zainal Abidin, 2005, “Bagaimana Mengintegrasikan Ilmu dan Agama? dalam Bagir, Zainal Abidin; Wahyudi, Jarot; Anshori, Afnan(ed); Integrasi Ilmu dan Agama: Interpetasi dan Aksi, MYIA-CRCS dan Suka Press, Yogyakarta.</p> <p>Barbour, Ian, 1971, Issues in Science and Religion, Harper Torchbooks, New York, Hagerstown, San Fransisco, London.</p> <p>_____, 1990, Religion in an Age of Science, Harper & Row, New York.</p> <p>_____, 2000, When Science Meets Religion, HarperSanFransisco, New York.</p> <p>_____, 2002, Nature, Human Nature, and God, Fortress Press, Minneapolis.</p> <p>Golshani, Mehdi, 2004, Issues in Islam and Science, IHCS, Tehran, Iran.</p> <p>_____, 2005, “Sacred Science and Secular Science”, dalam Zainal Abidin Bagir (ed), Science and Religion, in a Post-colonial World, Interfaith Perspectives, ATF Press, Australia.</p> <p>Guiderdoni, Bruno, 2004, Membaca Alam Membaca Ayat (kumpulan beberapa artikel), terj. Anton Kurnia dan Andar Nubowo, Mizan, Bandung.</p> <p>Hady, Samsul, M., 2007, “Peta Pemikiran pada Masa Renaissans Islam”, dalam Lutfi Mustofa dan Helmi Syaifuddin (ed), Intelektualisme Islam, Melacak Akar-akar Integrasi Ilmu dan Agama, LKQS & UIN Malang, Malang.</p> <p>Hardiman, F Budi, 2006, “Sain dan Pencarian Makna: Menyiasati Konflik Tua antara Sain dan Agama, Kompas, 2 Februari 2007.</p> <p>Haught, John, F., 2004, Science and Religion: From Conflict to Conversation, terj. Fransiskus Borgias, “Perjumpaan Sains dan Agama: dari Konflik ke Dialog”, Mizan, CRCS, ICAS, Bandung, Yogyakarta, Jakarta.</p> <p>Kuntowijoyo, 2007, Islam sebagai Ilmu: Epistemologi, Metodoogi dan Etika, Tiara Wacana, Yogyakarta.</p>

Reiser, Oliver L., 1973, Cosmic Humanism and World Unity, World Union Journal, Pondicherry, India, 19 September, 1973 didownload dari <http://www.earthportals.com/PortalMessenger/oliver.html>, tanggal 15 Maret 2007.

The Relationship between Science and Idiology

Ziman, John, 1984, An Introduction to Science Studies The Philosophical and Social Aspects of Science and Technology, Cambridge University Press, Cambridge.

Hakansta, Carin, 2013, Between Science and Politics, University of Gothenburg.

Pestre, Dominique, 2007, Science, Society, and Politics Knowledge Societies from an Historical Perspective: Report to the Science, Economy and Society Directorate European Commision January 2007.

Science and Scientific Responsibility

Bahm, Archie J., 1984, Axiology: The Science of Value, Albuquerque, New Mexico.

Chalmers, A.F., Apa Yang Dinamakan Ilmu Itu? (Judul Asli: What is this thing called Science?), Penerbit Hasta Mitra, Jakarta.

Boersema, David., 2008, Philosohy of Science, Prentice Hall, New York Honderich,

Ted, 1995, Oxford Companion to Philosophy, Oxford University Press Lacey, Hugh.,

1999, Is Science Value Free? Routledge, London.

Melsen, A.G.M, van., 1985, Ilmu Pengetahuan dan Tanggung Jawab Kita (Judul Asli: Wetenschap en Verantwoordelijkheid), Penerjemah: Bertens, Gramedia, Jakarta

Mustansyir & Misnal, 2009, Filsafat Ilmu, Pustaka Pelajar, Yogyakarta.

Rollin, Bernard E., Science and Ethics, Cambridge University Press.

Semiawan, Conny, dkk, 2004, Dimensi Kreatif Dalam Filsafat Ilmu, Remaja Rosdakarya, Bandung.

Online sources:

Philosophy of Science Part

I <https://www.youtube.com/watch?v=NmKLZ0eZpdY&feature=youtu.be>

Philosophy of Science Part

II <https://www.youtube.com/watch?v=9p01qVEj0A8&feature=youtu.be>

Philosophy of Science Part

III <https://www.youtube.com/watch?v=9p01qVEj0A8&feature=youtu.be>

When

the

Moors

Ruled

Europe <https://www.youtube.com/watch?v=oafKyRDagsY&t=12s>

Course Module 05

Module/Course Title: Academic Writing and Publication					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNX20 X11	3x50'	3 Sks	1		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Students are able to write manuscript draft according to the target journal requirement. Students are able to write proposal draft according to the guideline for writing thesis in Universitas Padjadjaran				
4	Subject aims/Content Scientific Writing and Publication courses are compulsory subjects for Semester I (one) students. Students learn the basic principles of critical and logical thinking, the basic concepts of writing scientific papers. Students are given an understanding of how to read scientific articles and how to cite them using literature citation software. Students are directed to develop research plans and present them. Students are also given an understanding of how to present research results in the form of relevant illustrations through the results of secondary data processing. At the end of the lecture, at least the achievements are tested in the form of a draft proposal and a draft research article (with secondary data) or a review article.				
5	Teaching methods Encounter 1 Study Overview: The purpose and function of Article Encounter 2 Critical Appraisal Journal Citation Reference Management Encounter 3 Identifying Research Problem Logical framework Writing Hypothesis Encounter 4 Background Encounter 5 Method Encounter 6 Results (Data Illustration and Visualization)				

	<p>Encounter 7 Fraud in Research</p>
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9 Discussion</p>
	<p>Encounter 10 Conclusion and Abstract</p>
	<p>Encounter 11 Type of article: Research article and Review Article</p>
	<p>Encounter 12 Introduction of R software</p>
	<p>Encounter 13 Creating study timeline</p>
	<p>Encounter 14 Writing manuscript draft</p>
	<p>Encounter 15 Writing proposal draft</p>
	<p>FINAL EXAMS</p>
6	<p>Assessment methods</p> <p>Encounter 1 – Paper/ – Report – & Discussion</p>
	<p>Encounter 2 – Take home assignment, reading and discussion</p>
	<p>Encounter 3 – Take home assignment, reading and discussion</p>
	<p>Encounter 4 – Take home assignment, reading and discussion</p>
	<p>Encounter 5 – Take home assignment, reading and discussion</p>
	<p>Encounter 6 Take home assignment, reading and discussion</p>
	<p>Encounter 7 Take home assignment, reading and discussion</p>
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9</p>

	<p>– Take home assignment, reading and discussion</p>
	<p>Encounter 10 – Take home assignment, reading and discussion</p>
	<p>Encounter 11 – Take home assignment, reading and discussion</p>
	<p>Encounter 12 – Paper/Report& Discussion</p>
	<p>Encounter 13 – Paper/Report& Discussion</p>
	<p>Encounter 14 – Paper/Report & Discussion</p>
	<p>Encounter 15 – Paper/Report & Discussion</p>
	<p>FINAL EXAMS 16</p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Dr. Sc. Dina Oktavia, S.Hut., M.Si 2. Mas Rizky A. A. Syamsunarno, dr.,M.Kes., Ph.D
9	<ol style="list-style-type: none"> 1. Cargill M., O'Connor P. (2009). <i>Writing Scientific Research Articles: Strategy and Steps</i>. Oxford: John Wiley & Sons Ltd. 2. Gastel, B., Day, R.A. (2016). <i>How to Write and Publish a Scientific Paper</i>. California: Greenwood. 3. Guideline for writing thesis. 2016. Universitas Padjadjaran

Course Module 06

Module/Course Title: Biotechnology research methodology					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNO20 205	2x50'	2 Sks	1		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Able to design research and compile research proposals in the field of biotechnology with measurable quality independent performance and avoid plagiarism and present it in a responsible manner				
4	Subject aims/Content The basic principles of preparing research proposals and research methodologies, various research designs, determining the appropriate research design, quantitative and qualitative data analysis.				
5	Teaching methods				
	Encounter 1 Lecture contract and introduction				
	Encounter 2 Fundamentals and philosophy of research methodology				
	Encounter 3 type of scientific work				
	Encounter 4 Thesis writing guide				
	Encounter 5 Thesis writing technique				
	Encounter 6 Error in writing thesis				
	Encounter 7 Evaluation				
	MIDTERM EXAM 8				
	Encounter 9 Basic biostatic for postgraduate				
	Encounter 10 Types of research (basic, applied, qualitative, quantitative, analytical etc)				
Encounter 11					

	<p>Features of translational research-concept of laboratory to market (bench to public) – industrial R&D</p>
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Literature Survey: Importance of Literature Survey - Sources of information, assessment of quality of journals and articles, information through internet
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Literature Review: Guidelines for Review, Record of Research Review - Data collection: collection of primary data, secondary data - Data organization: Methods of data grouping - Role of statistics for data analysis
	<p>Encounter 14</p> <ul style="list-style-type: none"> - Diagrammatic representation of data, Graphic representation of data. - Sample design, need for sampling, some important sampling definitions
	<p>Encounter 15</p> <ul style="list-style-type: none"> - Basic principles of Statistical Computation using SPSS - Research design
	<p><i>FINAL EXAMS 16</i></p>
6	<p>Assessment methods</p> <p>Encounter 1</p> <p>– Paper/Report& Discussion</p>
	<p>Encounter 2</p> <p>– Paper/Report& Discussion</p>
	<p>Encounter 3</p> <p>– Paper/Report& Discussion</p>
	<p>Encounter 4</p> <p>– Paper/Report& Discussion</p>
	<p>Encounter 5</p> <p>– Paper/Report& Discussion</p>
	<p>Encounter 6</p>
	<p>Encounter 7</p>
	<p><i>MIDTERM EXAM 8</i></p>

	<p>Encounter 9 – Paper/Report& Discussion</p>
	<p>Encounter 10 – Paper/Report& Discussion</p>
	<p>Encounter 11 – Paper/Report& Discussion</p>
	<p>Encounter 12 – Paper/Report& Discussion</p>
	<p>Encounter 13 – Paper/Report& Discussion</p>
	<p>Encounter 14 Paper/Report& Discussion</p>
	<p>Encounter 15 Paper/Report& Discussion</p>
	<p><i>FINAL EXAMS 16</i></p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Prof. Dr. Benny Joy, 2. Anne Nurbaity., Ir., Ph. D
9	<p>Other Information</p>

Course Module 07

Module/Course Title: Bioprocess					
Module course code	Student workload	Credits	Semester	Frequency	Duration
O20C 201	3x50'	3 Sks	2		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes At the end of the lecture, students are able to understand and analyze the scope of bioprocesses, enzymatic mobilization, understand cell growth kinetics, understand and create fermentation processes and the function of microorganism's nutrient elements and are able to design types of bioreactors for cells and enzymes and are able to analyze cell growth and fermentation processes.				
4	Subject aims/Content This course studies the use of living things or their components (bacteria, enzymes or chloroplasts) to obtain a product. Kinetics, influence on enzymatic reactions; This course also explains the phases of cell growth, cell growth kinetics and fermentation processes: influencing factors and conditions of fermentation based on nutrients. This course also discusses reactor design and considerations in designing bioreactors for cells and enzymes.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - Introduction to bioprocess technology 				
	Encounter 2 <ul style="list-style-type: none"> - The historical foundation and development. Importance of microbes in industry, microbial biomass 				
	Encounter 3 <ul style="list-style-type: none"> - Importance of microbial enzymes 				
	Encounter 4 <ul style="list-style-type: none"> - Isolation of industrially important microorganisms 				
	Encounter 5 <ul style="list-style-type: none"> - Primary and secondary screening 				
	Encounter 6 <ul style="list-style-type: none"> - Strain improvement and its method 				

	<p>Encounter 7</p> <ul style="list-style-type: none"> - Preservation and maintenance of strains
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9</p> <ul style="list-style-type: none"> - Fermentation technology
	<p>Encounter 10</p> <ul style="list-style-type: none"> - Primary and secondary metabolites
	<p>Encounter 11</p> <ul style="list-style-type: none"> - Batch culture, specific growth rate, substrate saturation constant and substrate affinity
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Microbial growth curve with Monod equation
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Continuous culture, turbidostat
	<p>Encounter 14</p> <ul style="list-style-type: none"> - Fed batch culture, maintenance coefficient
	<p>Encounter 15</p> <ul style="list-style-type: none"> - Bioreactor
	<p>FINAL EXAMS 16</p>
6	<p>Assessment methods</p> <p>Encounter 1</p> <ul style="list-style-type: none"> - Paper/Report & Discussion
	<p>Encounter 2</p> <ul style="list-style-type: none"> - Paper/Report & Discussion
	<p>Encounter 3</p> <ul style="list-style-type: none"> - Paper/Report & Discussion
	<p>Encounter 4</p> <ul style="list-style-type: none"> - Paper/Report & Discussion
	<p>Encounter 5</p> <ul style="list-style-type: none"> - Paper/Report & Discussion
	<p>Encounter 6</p>

	<ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 7</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 10</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 11</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 14</p>
	<p>Encounter 15</p>
	<p>FINAL EXAMS 16</p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Dr. Ratu Safitri, MS. 2. Dr. Pujawati Suryatmana, Drs., MP
9	<p>Other Information</p> <ol style="list-style-type: none"> 1. Ravindra, P. (13 Agustus 2015). <i>Advances in Bioprocess Technology</i>. Springer. p. 484. ISBN 9783319179155 2. Kirouac, D & Zandstra, P (2008). "The systematic production of cells for cell therapies". <i>Cell Stem Cell</i>. 3 (4): 369-381. doi:10.1016/j.stem.2008.09.01. PMID 18940729 3. Rowley. J. A. Developing Cell Therapy Biomanufacturing Processes, Chem Eng Progress, SBE Stem Cell Engineering Nov Supplement, 50-55, 2010 4. Bamforth, C.W, (2005) Food, Fermentation and Micro-organisms, 1st, ed. Blackwell Publishing Ltd 5. Draft Guidance: Instructions and Template for CMC Reviewers of Human

Somatic Cell Therapy IND Applications

6. Secondary Plant Metabolism. MacMillan, Cambridge Rare Book UK. Margaret L. & Brian Vickery. 1981.
7. Dionisi, D., 2021, Theory and Design of Fermentation Processes, , 1st ed, by CRC Press

Course Module 08:

Module/Course Title: Bioethics, Biosafety and Prospects for Biotechnology					
Module course code O20C 202	Student workload 3x50'	Credits 3 Sks	Semester 2	Frequency	Duration
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Able to show the difference between moral and legal ethics and the social and legal consequences of their violation.				
4	Subject aims/Content IPR, Biosafety and Bioethics provides a broad coverage of three areas of patenting— intellectual property rights (IPR), biosafety and bioethics. It creates awareness about the value of IPR in our lives and fosters a better understanding of the rights associated with IPR such as copyright, patent, trademarks, industrial designs, geographical indications and so on. Biosafety and bioethical issues prevalent in modern society are discussed.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> • Biosecurity and Bioterrorism of Animal origin Encounter 2 <ul style="list-style-type: none"> • Ecosystem changes and biosecurity threats through emerging and reemerging diseases Encounter 3 <ul style="list-style-type: none"> • Bushmeat Encounter 4 <ul style="list-style-type: none"> • Presentation: Bushmeat Encounter 5 <ul style="list-style-type: none"> • Presentation: emerging and reemerging diseases Encounter 6 Introducing of Bioethics Encounter 7 Bioethical principles and rules in biosafety MIDTERM EXAM 8 Presentation: Biosafety Encounter 9				

	<ul style="list-style-type: none"> • Ethics Case Discussion
	Encounter 10 <ul style="list-style-type: none"> • History of Biotechnology
	Encounter 11 <ul style="list-style-type: none"> • Coverage of Biotechnology
	Encounter 12 <ul style="list-style-type: none"> • Developments and Prospects of Biotechnology
	Encounter 13 <ul style="list-style-type: none"> • Intellectual property right
	Encounter 14 <ul style="list-style-type: none"> • Presentation: Developments and Prospects of Biotechnology
	<i>FINAL EXAMS 15</i>
6	Assessment methods
	Encounter 1 – Paper/Report& Discussion
	Encounter 2 – Paper/Report& Discussion
	Encounter 3 – Paper/Report& Discussion
	Encounter 4 – Paper/Report& Discussion
	Encounter 5 – Paper/Report& Discussion
	Encounter 6
	Encounter 7
	<i>MIDTERM EXAM 8</i>
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion

	Encounter 12 – Paper/Report& Discussion
	Encounter 13 – Paper/Report& Discussion
	Encounter 14
	Encounter 15
	FINAL EXAMS 16
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course <ol style="list-style-type: none"> 1. Prof. Dr. Drh. Roostita L. Balia 2. Ir. Anas Zubeir, MS.c., Ph.D
9	Other Information Books? Depa Goel, Shomini Parashar (2013). <i>IPR, biosafety, and bioethics</i> . Pearson education, India, 2013. http://Oproquest.safaribooksonline.com/9788131774700

Course Module 09:

Module/Course Title : Techno Economics and Legal Aspects of Biotechnology Products					
Module course code O20C 202	Student workload 3x50'	Credits 3 Sks	Semester 2	Frequency	Duration
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Students master the basic concepts of management, business economics and legal protection in biotechnology.				
4	Subject aims/Content To study biotechnology policy, global economic and legal issues				
5	Teaching methods				
	Encounter 1 Basic Economic Concepts				
	Encounter 2 Management and Business for Industri				
	Encounter 3 Biotechnology Investment				
	Encounter 4 Cash flow analysis, Marketing, Human Resources and Operations				
	Encounter 5 Presentation: Economic Feasibility Analysis of Biotechnology Products				
	Encounter 6 Intellectual Property Rights				
	Encounter 7 Patent Search, presentation				
	MIDTERM EXAM 8				
	Encounter 9 • Patent Drafting				
	Encounter 10 • Patent Drafting Presentation				
	Encounter 11 • Communal Intellectual Property Rights for Genetic Resources and Traditional Knowledge Genetic Resources				
	Encounter 12 • International Law of Biological Safety				
	Encounter 13				

	<ul style="list-style-type: none"> • Comparison of National Intellectual Property Rights Regimes
	Encounter 13 International legal basis for Biotechnology Intellectual Property Rights
	Encounter 14 Intellectual Property Rights for Biotechnology Products
	Encounter 15 Presentation: Intellectual Property Rights for Biotechnology Products
	FINAL EXAMS
6	Assessment methods Encounter 1 – Paper/Report& Discussion
	Encounter 2 – Paper/Report& Discussion
	Encounter 3 – Paper/Report& Discussion
	Encounter 4 – Paper/Report& Discussion
	Encounter 5 – Paper/Report& Discussion
	MIDTERM EXAM
	Encounter 7 – Paper/Report& Discussion
	Encounter 8 – Paper/Report& Discussion
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion
	FINAL EXAMS
7	This module/course is used in the following study programme/s as well Yes

8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Dr. Sulaeman Rahman Nidar 2. Miranda Risang Ayu, S.H, LL.M., PhD.
9	<p>Other Information</p> <ul style="list-style-type: none"> • Economics, 17 th edition, P.A. Samuelson; W.D. Nordhaus, Irwin Mc Graw Hill • Principle of Managerial Finance, 12 th edition, L. J. Gitman, • Adrian Sutedi. 2013. Hak Atas Kekayaan Intelektual, Cetakan Kedua, Sinar Grafika, Jakarta. • UU No. 31 Tahun 2000 tentang Desain Industri • UU No. 13 Tahun 2016 tentang Paten • UU No. 15 Tahun 2001 tentang Merek • UU No. 32 Tahun 2000 tentang Desain Tata Letak Sirkuit Terpadu • UU No. 30 Tahun 2000 tentang Rahasia Dagang • UU No. 29 Tahun 2000 tentang PVT • UU No. 28 Tahun 2014 tentang Hak Cipta • Baten, Jörg; Bianchi, Nicola; Moser, Petra .2017. "Compulsory licensing and innovation–Historical evidence from German patents after WWI". Journal of Development Economics. 126: 231–42. doi:10.1016/j.jdeveco.2017.01.002 • World Intellectual Property Organization.2021. What is Intellectual Property?. WIPO publication. World Intellectual Property Organization (WIPO). doi:10.34667/tind.43765. ISBN 9789280532210. Retrieved 23 October 2020. • http://wipo.int • http://uspto.gov. • http://www.dgip.go.id

Course Module 10 (Elective course 1)

Module/Course Title: Biomass and Bio-energy Technologies					
Module course code	Student workload	Credits	Semester	Frequency	Duration
PSL 624	2x50'	2 Sks	2		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes At the end of the lecture, students are able to understand and analyze the benefits of using biomass to produce bioenergy products such as bioethanol, biodiesel, etc.				
4	Subject aims/Content This course discusses a variety of biomass from the first generation to the renewable in its use as a potential bioenergy raw material to be developed in Indonesia (based on oil, starch, lignocellulosic, algae and other biomass). This course also explains the parameters of the sustainability indicator of bioenergy; analyze the process technology for chemical/physical/biological conversion of raw materials (agricultural products) into bioenergy (biodiesel, green diesel, green gasoline, biooil, bioavtur, bioelectricity, bioethanol, biogas, biopellet, and biobriquettes) and quality standards and analytical methods. This course also discusses the utilization of by-products from the bioenergy industry through various conversion processes.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - Biomass as feedstock Encounter 2 <ul style="list-style-type: none"> - Various chemicals produced from biomass Encounter 3 <ul style="list-style-type: none"> - Teknologi proses biofuel Encounter 4 <ul style="list-style-type: none"> - Simulation in bioprocess Encounter 5 <ul style="list-style-type: none"> - Model formulations in the bioprocess industry Encounter 6 <ul style="list-style-type: none"> - Formulation and optimization of the superstructure 				

	<p>Encounter 7</p> <ul style="list-style-type: none"> – Case studies on superstructures
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9</p> <ul style="list-style-type: none"> – Numerical investigation on steam-air biomass gasification process based on model
	<p>Encounter 10</p> <ul style="list-style-type: none"> – Wastewater treatment by optimizing the Fe₂O₃ calcination temperature on the innovative Bio-Electron-Fenton fuel process
	<p>Encounter 11</p> <ul style="list-style-type: none"> – Effect of wall boundary layer thickness on fuel cell recirculation microbial power performance
	<p>Encounter 12</p> <ul style="list-style-type: none"> – Biodiesel production from microbes using direct transesterification of Rhodotorula glutinis biomass
	<p>Encounter 13</p> <ul style="list-style-type: none"> – Analysis of syngas production from biogas through the Tri-Reforming process
	<p>Encounter 14</p> <ul style="list-style-type: none"> – Utilization of bamboo fiber and sugarcane husk as bio-briquette fuel
	<p>Encounter 15</p> <ul style="list-style-type: none"> – Electrochemical hydrogenation of acetone for the production of isopropanol using an electrolyte polymer membrane reactor
	<p>FINAL EXAMS 16</p>
6	<p>Assessment methods</p> <p>Encounter 1</p> <ul style="list-style-type: none"> – Paper/Report& Discussion
	<p>Encounter 2</p> <ul style="list-style-type: none"> – Paper/Report& Discussion
	<p>Encounter 3</p> <ul style="list-style-type: none"> – Paper/Report& Discussion
	<p>Encounter 4</p> <ul style="list-style-type: none"> – Paper/Report& Discussion

	<p>Encounter 5 – Paper/Report& Discussion</p>
	<p>Encounter 6</p>
	<p>Encounter 7</p>
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9 – Paper/Report& Discussion</p>
	<p>Encounter 10 – Paper/Report& Discussion</p>
	<p>Encounter 11 – Paper/Report& Discussion</p>
	<p>Encounter 12 – Paper/Report& Discussion</p>
	<p>Encounter 13 – Paper/Report& Discussion</p>
	<p>Encounter 14</p>
	<p>Encounter 15</p>
	<p>FINAL EXAMS 16</p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Prof. Dr. Ratu Safitri, MS. 2. Dr. Rukiah, Dra., MT
9	<p>Other Information</p> <ol style="list-style-type: none"> 1. Chemicals from Biomass-Integrating Bioprocesses into Chemical Production Complexes for Sustainable Development 2. Advances in Bioprocess Technology 3. Biofuel and Bioenergy Technology 4. Biobutanol production from corn stover hydrolysate pretreated with recycled ionic liquid by <i>Clostridium saccharobutylicum</i> DSM 13864 http://dx.doi.org/10.1016/j.biortech.2015.07.119 5. Biomass Conversion Technologies for Renewable Energy and Fuels: A Review

Note. <https://www.researchgate.net/publication/274126129>

6. Fungal biomass and ethanol from lignocelluloses using *Rhizopus* pellets under simultaneous saccharification, filtration, and fermentation (SSFF) [10.18331/BRJ2016.3.1.7](https://doi.org/10.18331/BRJ2016.3.1.7)
7. Yeasts in sustainable bioethanol production: A review
<http://dx.doi.org/10.1016/j.bbrep.2017.03.003>

Course Module 11 (Elective course 2)

Module/Course Title: Microbial Biotechnology					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UN020 309	2x50'	2 Sks	2		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Upon successful completion, students will be able to: 1. Explain how microbiology is applied to manufacturing in the pharmaceutical industry 2. Relate quality control to the manufacturing process 3. Describe the production methods for pharmaceuticals of microbial origin such as antibiotics and vaccines. 4- Improvement of microorganisms: rational screening based on known biochemical pathways and metabolic regulation; metabolic engineering by genetic manipulation of metabolic pathways or sequentially acting enzymes.				
4	Subject aims/Content This subject aim to understand application of microbial biotechnology				
5	Teaching methods Encounter 1 Introduction, scope and historical developments, importance of microbes in industry; microbial biomass, microbial enzymes, microbial metabolites and microbial recombinant products Encounter 2 Isolation, screening and genetic improvement of industrially important organisms Encounter 3 Fermentation, Definition, chronological development of fermentation industry, Submerged fermentation and solid state fermentation Encounter 4 Media for industrial fermentation, major components, water, carbon sources, nitrogen sources, minerals, chelators, oxygen requirement, rheology, foaming and antifoaming agents Encounter 5 Primary metabolism products, production of industrial ethanol as a case study Encounter 6 Secondary metabolites, bacterial antibiotics production Encounter 7 Recombinant DNA technologies for microbial processes; Strategies for development of industrial microbial strains with scale up production capacities; metabolic pathway engineering of microbes for production of novel product for industry. MIDTERM EXAM 8 Encounter 9				

	Microbial enzymes, role in various industrial processes, Bio -transformations, Bioaugmentation with production of vitamin C as a case study, Microencapsulation technologies for immobilization of microbial enzymes.
	Encounter 10 Industrial biotechnology for pollution control, treatment of industrial and other wastes, biomass production involving single cell protein
	Encounter 11 Bioprospecting and metagenomic to screening potential microbial
	Encounter 12 Direct evolution
	Encounter 13 Article review
	Encounter 14 Article review
	Encounter 15 Article review
	FINAL EXAMS 16
E6	Assessment methods
	Encounter 1 – Paper/Report& Discussion
	Encounter 2 – Paper/Report& Discussion
	Encounter 3 – Paper/Report& Discussion
	Encounter 4 – Paper/Report& Discussion
	Encounter 5
	Encounter 6
	Encounter 7
	MIDTERM EXAM 8
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11

	– Paper/Report& Discussion
	Encounter 12
	Encounter 13
	Encounter 14
	Encounter 15
	<i>FINAL EXAMS</i>
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course <ol style="list-style-type: none"> 1. Prof. Dr. Ratu Safitri, MS. 2. Dr. Shabarni Gaffar, MSi
9	Other Information Kun LY. 2006. Microbial Biotechnology. World Scientific. Tortora et al. 2008. Microbiology an introduction, Pearson Education

Course Module 12 (Elective course 3)

Module/Course Title: Immunology and Vaccine Development					
Module course code UNO20 312	Student workload 2x50'	Credits 2 Sks	Semester 2	Frequency	Duration
1	Type of course	Contact hours	Independent study	Class size maximum of about 20 students	
2	Prerequisites for participation (if applicable) ; Students already understand the course material for cell building biomolecules, the basics of biochemistry				
3	Learning outcomes Students are able to explain: the basics of immunology; the immune system and its components, how the role of vaccines in the body's defense system, strategies for mapping and evaluating protein recombinas as vaccine components, manufacturing conventional vaccines and developing recombinant vaccines, various conventional and modern vaccine efficacy test methods.				
4	Subject aims/Content This course discusses the fundamentals of the immune system which includes aspects of the mechanism of the immune system, components of the immune system, vaccine manufacturing, strategies for mapping and evaluating recombinant vaccines, and vaccine efficacy test methods.				
5	Teaching methods				
	Encounter 1 An Overview of the immune system				
	Encounter 2 General properties of immune responses				
	Encounter 3 Recognition of antigens, The Major Histocompatibility Complex				
	Encounter 4 Antigen processing and presentation to the lymphocytes				
	Encounter 5 Antigen receptors and accessory molecules of T lymphocytes				
	Goal of vaccines development, vaccine development stages, vaccine manufacturing, challenge for vaccine development.				
	Encounter 7 How is vaccine effectiveness measured? How is vaccine efficacy calculated?				
	MIDTERM EXAM 8				
	Encounter 9				

	Encounter 10
	Encounter 11
	Encounter 12
	Encounter 13
	Encounter 14
	Encounter 15
	<i>FINAL EXAMS 16</i>
6	Assessment methods
	Encounter 1 – Paper/Report& Discussion
	Encounter 2 – Paper/Report& Discussion
	Encounter 3 – Paper/Report& Discussion
	Encounter 4 – Paper/Report& Discussion
	Encounter 5 – Paper/Report& Discussion
	Encounter 6
	Encounter 7
	<i>MIDTERM EXAM 8</i>
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion
	Encounter 12 – Paper/Report& Discussion
	Encounter 13 – Paper/Report& Discussion
	Encounter 14

	Encounter 15
	<i>FINAL EXAMS 16</i>
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course 1. Prof. Dr. Toto Subroto, MS. 2. dr. Edhyana K. Sahiratmadja, Ph.D.
9	Other Information 1. Abbas, A.K & Lichmants, A.H (2005). Cellular and Molecular Immunology(5 ed). Philadelphia: Elsvier Saunders 2. Sompayrac, L (2019) .How the Immune System Works (Sixth Edition) Massahusetts,USA: Blackwell Publisihing

Course Module 13 (Elective course 4)

Module/Course Title: Environmental Biotechnology					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNX 796a	2x50'	2 Sks	2		
1	Type of course	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes				
4	Subject aims/Content In this course, students learn about the use of biomechanics in the environment, including for environmental monitoring, molecular tools for environmental applications, Nanotechnology and its applications in the environment, green technology and its application to the environment, and test responsibility (Examination Responsibility disputes).				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - basic concepts and objectives of Environmental, Biomolecular, Biomarkers and bioindicators 				
	Encounter 2 <ul style="list-style-type: none"> - Green technology from a biological point of view. 				
	Encounter 3 <ul style="list-style-type: none"> - Molecular Biotechnology for environmental monitoring (1) 				
	Encounter 4 <ul style="list-style-type: none"> - Molecular Biotechnology for environmental monitoring (2) 				
	Encounter 5 <ul style="list-style-type: none"> - Molecular tools for environmental applications (1) 				
	Encounter 6 <ul style="list-style-type: none"> - Molecular tools for environmental applications (2) 				
	Encounter 7 <ul style="list-style-type: none"> - Nanotechnology and its application in the environment, 				
	MIDTERM EXAM 8				

	<p>Encounter 8 environmentally friendly technology and production. Energy, Green building, Green chemistry, Green engineering</p>
	<p>Encounter 9 concepts: sustainability, recycling, waste and pollution reduction, innovation, viability</p>
	<p>Encounter 10 Use of Nanotechnology equipment methods and their application in the environment (1)</p>
	<p>Encounter 11 Use of Nanotechnology equipment methods and their application in the environment (2)</p>
	<p>Encounter 12 explain various concepts: sustainability, recycling, waste and pollution reduction, innovation, viability</p>
	<p>Encounter 13 Environmentally friendly technology and production. Energy, Green building, Green chemistry, Green (1)</p>
	<p>Encounter 14 Environmentally friendly technology and production. Energy, Green building, Green chemistry, Green (2)</p>
	<p>Encounter 15 Paper assignments and student presentations:Energy, Green building, Green chemistry, Green</p>
	<p>FINAL EXAMS 16</p>
6	<p>Assessment methods</p> <p>Encounter 1 – Paper/Report& Discussion</p>
	<p>Encounter 2 – Paper/Report& Discussion</p>
	<p>Encounter 3 – Paper/Report& Discussion</p>
	<p>Encounter 4 – Paper/Report& Discussion</p>
	<p>Encounter 5 – Paper/Report& Discussion</p>
	<p>Encounter 6 Paper/Report& Discussion</p>
	<p>Encounter 7</p>

	Paper/Report& Discussion
	MIDTERM EXAM 8
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion
	Encounter 12 – Paper/Report& Discussion
	Encounter 13 – Paper/Report& Discussion
	Encounter 14
	Encounter 15
	FINAL EXAMS
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course 1. Dr. Dadan Sumiarsa., M.Si 2. Dr. Rukiah, Dra.,MT
9	Other Information 1. Wacket, L.P., Bruce, N.C, 2000. Environmental Biotechnology Towards Sustainability. Current in Opinion in Biotechnology. Elsevier Science, Ltd. 2. Anthony, C. Jeffrey, M. 2000. Expanding use of forensic in environmental science. Environment Science & Technology, 34, 262

Course Module 14 (Elective course 5)

Module/Course Title : Minerale Biotechnology					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNX 796a	2x50'	2 Sks	2		
1	Type of course	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes At the end of the lecture, students are able to explain about Biomineral Sources and Mineral Resources/Mining Materials and are able to analyze Biomineral Case Study and Ecoindustrial Revolution studies. Also able to explain Biotechnology, Microbes and Bioremediation Metabolism, Phytotechnology and Photosynthesis as well as environmental biotechnology, waste and biotechnology applications. Apply and analyze the degradation of mineral waste.				
4	Subject aims/Content This course discusses the scope of biomineral science, biomineral sources and mineral resources/mining materials, environmental biotechnology regarding waste, contaminant areas and bioremediation, also discusses aerobics and effluents, phytotechnology and photosynthesis, mineral waste, genetic manipulation and applications in the field of mineral biotechnology.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - Introduction to Biomineral 				
	Encounter 2 <ul style="list-style-type: none"> - Biomineral Resources and Mineral Resources/Mining Materials 				
	Encounter 3 <ul style="list-style-type: none"> - Case Study Biomineral and Ecoindustrial Revolution 				
	Encounter 4 <ul style="list-style-type: none"> - Environmental biotechnology and applications 				
	Encounter 5 <ul style="list-style-type: none"> - Biotechnology, Microbes and Metabolism 				
	Encounter 6 <ul style="list-style-type: none"> - Basics of Biological Intervention 				

	<p>Encounter 7</p> <ul style="list-style-type: none"> - Pollution and Pollution Handling
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 8</p> <ul style="list-style-type: none"> - Areas of Contaminants and Bioremediation
	<p>Encounter 9</p> <ul style="list-style-type: none"> - Aerobic and Effluent
	<p>Encounter 10</p> <ul style="list-style-type: none"> - Phytotechnology and Photosynthesis
	<p>Encounter 11</p> <ul style="list-style-type: none"> - Biotechnology and Waste
	<p>Encounter 12</p> <ul style="list-style-type: none"> - Genetic Manipulation
	<p>Encounter 13</p> <ul style="list-style-type: none"> - Biotechnology Environment Integration
	<p>Encounter 14</p> <ul style="list-style-type: none"> - Application of biotechnology environment
	<p>Encounter 15</p> <p>Student presentations on the topic of Biotechnology and waste</p>
	<p>FINAL EXAMS 16</p>
6	<p>Assessment methods</p> <p>Encounter 1</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 2</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 3</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 4</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 5</p> <ul style="list-style-type: none"> - Paper/Report& Discussion
	<p>Encounter 6</p>

	Paper/Report& Discussion
	Encounter 7 Paper/Report& Discussion
	MIDTERM EXAM 8
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion
	Encounter 12 – Paper/Report& Discussion
	Encounter 13 – Paper/Report& Discussion
	Encounter 14 Paper/Report& Discussion
	Encounter 15 Paper/Report& Discussion
	FINAL EXAMS
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course 1. Ir. Reginawanti Hendersyah 2. Dr. Rukiah., Dra.,M.T
9	Other Information 1. Gareth, G.M., Furlong, J.C., 2003, Environmental biotechnology: theory and application, John Wiley & Sons Ltd, England 2. Konhauser, K., 2007, Introduction To Geomicrobiology, 1st Ed., Blackwell Publishing. Sposito, G. 1989. <i>The Chemistry of Soils</i> . Oxford Universty Press, NewYork. 3. Klein, C. and C.S. Hurlbut J. 1993. <i>Manual of Mineralogy</i> (after James D. Dana). John Wiley and Sons Inc., New York. 4., Case Studies On Minerals, Chapter 5, The Mining, Minerals And Sustainable Development Project MMSD

	5. Pujianto, E, dkk., 2014, Konsep Penambangan Endapan Mineral Bawah Air di Laut Dangkal, Balitbang Energi Dan Sumber Daya Mineral Puslitbang Teknologi Mineral Dan Batubara
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Course Module 15 (Elective course 6)

Module/Course Title: Genome Editing Technology					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNX 796a	2x50'	2 SKS	2		
1	Type of course		Contact hours	Independent study	Class size
	Regular/Full Time				
2	Prerequisites for participation (if applicable)				
3	<p>Learning outcomes</p> <p>Students are able to illustrate the regulation of gene expression, DNA repair system, and their implications for genetic engineering, distinguish genome editing techniques, evaluate the procedures and methods of genome editing (CRISPR/Cas system), and design the strategies for the application of genome editing in plant, animal and human health (depend on the student field of study).</p>				
4	<p>Subject aims/Content</p> <p>Precise genome engineering by the introduction of double-strand break (DSB) or single-strand break (SSB), which are repaired through non-homology end joining (NHEJ) and homology-directed repair (HDR) mechanisms, has greatly accelerated research in plant, animal, and human health. In particular, CRISPR/Cas technology has been successfully utilized to improve crop and animal qualities to meet human needs. Meanwhile, in human health, such technology has facilitated the discovery of novel therapeutics. It has also been used as a clinical tool for gene therapy.</p> <p>This graduate-level course is designed to teach students about the cell and molecular biology and the basics of bioinformatics for genome editing, the type of genome editing techniques, the procedure of CRISPR-Cas genome editing technology, its applications to research in plant, animal, and human health, and the ethical/societal considerations surrounding this powerful technology.</p>				
5	<p>Teaching methods</p> <p>Encounter 1</p> <p>Course Overview: Genome Editing Technology</p> <hr/> <p>Encounter 2</p> <p>Basic of Cell and Molecular biology: Molecular biology</p> <hr/> <p>Encounter 3</p>				

	Basic of Cell and Molecular biology: Cell cycle and DNA repair mechanism
	Encounter 4 Introduction to Genome Editing Technology
	Encounter 5 CRISPR/Cas System
	Encounter 6 Bioinformatic for CRISPR/Cas Application
	Encounter 7 Fundamental of CRISPR/Cas Experiment
	MIDTERM EXAM 8
	Encounter 9 Procedure and sgRNA design in CRISPR/Cas Application
	Encounter 10 Evaluation of CRISPR/Cas Application Result: editing event (on-target and off-target)
	Encounter 11 Ethical consideration and regulation of GE
	Encounter 12 Application of CRISPR/Cas System in Higher Plants
	Encounter 13 Application of CRISPR/Cas System in Animal
	Encounter 14 Application of CRISPR/Cas system for Human Health
	Encounter 15 Presentation and Discussion of Final Project
	FINAL EXAMS 16
6	Assessment methods
	Encounter 1 Discussion
	Encounter 2 Reading assignment & discussion
	Encounter 3 Reading assignment & discussion
	Encounter 4

	Reading assignment & discussion
	Encounter 5 Reading assignment & discussion
	Encounter 6 Reading assignment & discussion
	Encounter 7 Reading assignment & discussion
	MIDTERM EXAM 8
	Encounter 9 Paper/report, reading assignment & discussion
	Encounter 10 Paper/report, reading assignment & discussion
	Encounter 11 Reading assignment & discussion
	Encounter 12 Reading assignment & discussion
	Encounter 13 Reading assignment & discussion
	Encounter 14 Reading assignment & discussion
	Encounter 15 Paper/report, presentation & discussion
	FINAL EXAMS
7	This module/course is used in the following study program/s as well Yes
8	Responsibility for module/course <ol style="list-style-type: none"> 1. Farida Damayanti, SP., M.Sc., Ph.D. 2. Ir. Anas, M.Sc., Ph.D.
9	Other Information Books: <ol style="list-style-type: none"> 1. Bhattacharya, A., V. Parkhi, and B. Char (2020) CRISPR/Cas Genome Editing: Strategies and potential for crop improvement. Springer Nature Switzerland AG.

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| | <ol style="list-style-type: none">2. Cathomen, T., M. Hirsch, and M. Porteus (2016) Genome Editing: The next step in gene therapy. Springer Science+Business Media LLC. New York. USA.3. Dederer, H and D. Hamburger (2019) Regulation of Genome Editing in Plant Biotechnology: A comparative analysis of regulatory frameworks of selected countries and the EU. Springer Nature Switzerland AG.4. Hartl, D.L. (2020) Essential Genetics and Genomics. Seventh Edition. Jones & Bartlett Learning. Burlington, MA, USA.5. Hatada, I (2017) Genome Editing in Animals: Methods and Protocols. Humana Press. Springer Science+Business Media LLC. New York. USA.6. Islam, M.T., P.K. Bhowmik, and K.A. Molla (2020) CRISPR-Cas Methods. Springer Science+Business Media LLC. New York. USA.7. Turksen, K. (2016) Genome Editing. Springer International Publishing Switzerland. |
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Course Module Doctor Bioteknologi Program

Course Module 01

Module/Course Title: Phylosophy of Science					
Module course code	Student workload 2x50'	Credits 2 Sks	Semester 1	Frequency	Duration
1	Type of course Regular/Full Time		Contact hours	Independent study	Class size
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Students are able to develop ideas about the nature of the seeker of knowledge, the essence of ontology, the essence of seeking the epistemology of values and the function of axiology, concerning the similarities and differences between natural sciences and social sciences and the relationship between theoretical epistemology and methodology.				
4	Subject aims/Content Knowledge (science) as normatively guided knowledge (from God Almighty, Allah Subhanahu Wataala). The search or mastery of knowledge (the quest for knowledge). Humans are capable of knowing, reasoning, and the results of reasoning. History of the development of philosophy and science. The world of ratio and taste; effort versus destiny. Empirical science; science anatomy. Deductive and inductive reasoning. The relationship between philosophy, science, and methodology (methods and techniques). Similarities and differences between the natural sciences and the social-humanitarian sciences. Pioneering science (science) based on religion. The same topics developed from the brief syllabus above were discussed by the teaching team with students in several parallel groups/classes.				
5	Teaching methods Encounter 1 <ul style="list-style-type: none"> - Understanding and Scope of Philosophy of Science - Philosophy of Science (Ontology, Epistemology, and Axiology) - Demarcation (Separation Boundary) Between Science and Non-Science Encounter 2 The Emergence of Philosophical of Science (Classical Antiquity-Muslim Medieval Era-Scientific Revolution) <ul style="list-style-type: none"> - Classical Debates between Aristotle (384-322 BC) and Plato (428-348 BC) (ratio, abstract world, logic and empiricism) 				

- Transmission of Greek intellectual tradition through Medieval Muslim Scholars (Ibn Sina (Avicennism), Ibn Rushd (Averroism), and Andalusian and Toledo Tradition)
- Thomas Aquinas and Nicholas Copernicus in the Debate between Religious Dogma (Catholic Church) and ScienceScientific Revolution – Renaissance (The Development of Scientific Methods in Understanding Nature)

Encounter 3

Logic and Empirism

- The Empiricist Tradition
- The Vienna Circle
- Central Ideas of Logical Positivism
- Problems and Changes
- On the Fall of Logical Empiricism

Encounter 4

Induction and confirmation

- The mother of all problems
- Induction, Deduction, Confirmation and Explanatory Inference
- The Ravens Problems
- Goodman’s New Riddle of Induction

Encounter 5

Popper: Conjecture and Refutation I

- Popper’s Unique Place in the Philosophy of Science
- Popper’s Theory of Science
- Objections to Popper on Falsification

Encounter 6

Popper: Conjecture and Refutation II

- Objections to Popper on Confirmation
- Further Comments on the Demarcation Problems

Encounter 7

Kuhn and Normal Science

- “The Paradigm Has Shifted”
- Paradigms: A Closer Look
- Normal Science

	<ul style="list-style-type: none"> - Anomaly and Crisis - Wrap-up of Normal Science
	MIDTERM EXAM 8
	Encounter 9 Kuhn and Revolutions <ul style="list-style-type: none"> - Considerable Upset - Revolutions and Their Aftermath - Incommensurability, Relativism, and Progress - The X-Rated “Chapter X” - Final Thoughts on Kuhn
	Encounter 10 Natural Science, Social Science and Humaniora with the reference book: <ul style="list-style-type: none"> - Peter Goodfrey-Smith, 2003, An Introduction to the Philosophy of Science: Theory and Reality, Chicago University Press (PGS) - James Ladyman, 2002, Understanding Philosophy of Science, Routledge (JL) - A.F. Chalmers, 1976, What is This Thing Called Science? Third Edition, Hackett Publishing Company (AFC)
	Encounter 11 The Relationship of Science with Ideology, Religion, and Culture I <ul style="list-style-type: none"> - Relation of Science with Ideology - Relation of Science with Religion - Relationship between Science and Culture
	Encounter 12 The Relationship of Science with Ideology, Religion, and Culture II
	Encounter 13 Science and Scientific Responsibility (Class Discussion).
	Encounter 14 Science and Scientific Responsibility (Class Discussion).
	Encounter 15 Class discussion
	FINAL EXAMS 16
6	Assessment methods Encounter 1

	– Paper/Report& Discussion
	Encounter 2 – Paper/Report& Discussion
	Encounter 3 – Paper/Report& Discussion
	Encounter 4 – Paper/Report& Discussion
	Encounter 5 – Paper/Report& Discussion
	Encounter 6 – Paper/Report& Discussion
	Encounter 7 – Paper/Report& Discussion
	MIDTERM EXAM 8
	Encounter 9 – Paper/Report& Discussion
	Encounter 10 – Paper/Report& Discussion
	Encounter 11 – Paper/Report& Discussion
	Encounter 12 – Paper/Report& Discussion
	Encounter 13 – Paper/Report& Discussion
	Encounter 14 Paper/Report& Discussion
	Encounter 15 Paper/Report& Discussion
	FINAL EXAMS 16
7	This module/course is used in the following study programme/s as well Yes
8	Responsibility for module/course

	<p>3. Prof. Dr. Ir. Mahfud Arifin., MS</p> <p>4. Dr. Rahmat Hidayat., S.Pt., M.Si</p>
9	<p>Other Information</p> <p>Main Books</p> <p>Peter Goodfrey-Smith, 2003, <i>An Introduction to the Philosophy of Science: Theory and Reality</i>, Chicago University Press (PGS)</p> <p>James Ladyman, 2002, <i>Understanding Philosophy of Science</i>, Routledge (JL)</p> <p>A.F. Chalmers, 1976, <i>What is This Thing Called Science? Third Edition</i>, Hackett Publishing Company (AFC)</p> <p>The Relationship between Science and Religion</p> <p>Abdullah, Amin, 2003, "Etika Tauhidik sebagai Dasar Kesatuan Epistemologi Keilmuan Umum dan Agama (dari Paradigma Positivistik-Sekularistik ke arah Teoantroposentrik-Integralistik)", dalam Jarot Wahyudi, M. Anas Amin, Mustofa (ed), <i>Menyatukan Kembali Ilmu-ilmu Agama dan Umum: Upaya mempertemukan Epistemologi Islam dan Umum</i>, Sunan Kalijaga Press, Yogyakarta.</p> <p>Al-Attas, Syed Muhammad Naquib, 1981, <i>Islam dan Sekularisme</i>, Pustaka, Bandung.</p> <p>_____, 1995, <i>Islam dan Filsafat Sain</i>, terj. Saiful Muzani, Mizan, Bandung.</p> <p>Al-Faruqi, Ismail Raji', 1984, <i>Islamisasi Pengetahuan</i>, Pustaka Salman, Bandung.</p> <p>Anshari, Endang Saifuddin, 1987, <i>Ilmu Filsafat dan Agama</i>, PT Bina Ilmu, Surabaya.</p> <p>Bagir, Zainal Abidin, 2005, "Bagaimana Mengintegrasikan Ilmu dan Agama? dalam Bagir, Zainal Abidin; Wahyudi, Jarot; Anshori, Afnan(ed); <i>Integrasi Ilmu dan Agama: Interpetasi dan Aksi</i>, MYIA-CRCS dan Suka Press, Yogyakarta.</p> <p>Barbour, Ian, 1971, <i>Issues in Science and Religion</i>, Harper Torchbooks, New York, Hagerstown, San Fransisco, London.</p> <p>_____, 1990, <i>Religion in an Age of Science</i>, Harper & Row, New York.</p> <p>_____, 2000, <i>When Science Meets Religion</i>, HarperSanFransisco, New York.</p> <p>_____, 2002, <i>Nature, Human Nature, and God</i>, Fortress Press, Minneapolis.</p> <p>Golshani, Mehdi, 2004, <i>Issues in Islam and Science</i>, IHCS, Tehran, Iran.</p> <p>_____, 2005, "Sacred Science and Secular Science", dalam Zainal Abidin Bagir (ed), <i>Science and Religion, in a Post-colonial World, Interfaith Perspectives</i>, ATF Press, Australia.</p> <p>Guiderdoni, Bruno, 2004, <i>Membaca Alam Membaca Ayat</i> (kumpulan beberapa artikel), terj. Anton Kurnia dan Andar Nubowo, Mizan, Bandung.</p> <p>Hady, Samsul, M., 2007, "Peta Pemikiran pada Masa Renaissans Islam", dalam Lutfi Mustofa dan Helmi Syaifuddin (ed), <i>Intelektualisme Islam, Melacak Akar-akar Integrasi Ilmu dan Agama</i>, LKQS & UIN Malang, Malang.</p> <p>Hardiman, F Budi, 2006, "Sain dan Pencarian Makna: Menyasati Konflik Tua antara Sain dan Agama", Kompas, 2 Februari 2007.</p> <p>Haught, John, F., 2004, <i>Science and Religion: From Conflict to Conversation</i>, terj. Fransiskus Borgias, "Perjumpaan Sains dan Agama: dari Konflik ke Dialog", Mizan, CRCS, ICAS, Bandung, Yogyakarta, Jakarta.</p>

Kuntowijoyo, 2007, Islam sebagai Ilmu: Epistemologi, Metodoogi dan Etika, Tiara Wacana, Yogyakarta.

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The Relationship between Science and Idiology

Ziman, John, 1984, An Introduction to Science Studies The Philosophical and Social Aspects of Science and Technology, Cambridge University Press, Cambridge.

Hakansta, Carin, 2013, Between Science and Politics, University of Gothenburg.

Pestre, Dominique, 2007, Science, Society, and Politics Knowledge Societies from an Historical Perspective: Report to the Science, Economy and Society Directorate European Commision January 2007.

Science and Scientific Responsibility

Bahm, Archie J., 1984, Axiology: The Science of Value, Albuquerque, New Mexico.

Chalmers, A.F., Apa Yang Dinamakan Ilmu Itu? (Judul Asli: What is this thing called Science?), Penerbit Hasta Mitra, Jakarta.

Boersema, David., 2008, Philosohy of Science, Prentice Hall, New York Honderich, Ted, 1995, Oxford Companion to Philosophy, Oxford University Press Lacey, Hugh., 1999, Is Science Value Free? Routledge, London.

Melsen, A.G.M, van., 1985, Ilmu Pengetahuan dan Tanggung Jawab Kita (Judul Asli: Wetenschap en Verantwoordelijkheid), Penerjemah: Bertens, Gramedia, Jakarta

Mustansyir & Misnal, 2009, Filsafat Ilmu, Pustaka Pelajar, Yogyakarta.

Rollin, Bernard E., Science and Ethics, Cambridge University Press.

Semiawan, Conny, dkk, 2004, Dimensi Kreatif Dalam Filsafat Ilmu, Remaja Rosdakarya, Bandung.

Online sources:

Philosophy of Science Part
I <https://www.youtube.com/watch?v=NmKLZ0eZpdY&feature=youtu.be>

Philosophy of Science Part
II <https://www.youtube.com/watch?v=9p01qVEj0A8&feature=youtu.be>

Philosophy of Science Part
III <https://www.youtube.com/watch?v=9p01qVEj0A8&feature=youtu.be>

When the Moors Ruled Europe <https://www.youtube.com/watch?v=oafKyRDagsY&t=12s>

Course Module 02

Module/Course Title: Academic Writing and Publication					
Module course code	Student workload	Credits	Semester	Frequency	Duration
UNX20 X11	3x50'	3 Sks	1		
1	Type of course Regular/Full Time	Contact hours	Independent study	Class size	
2	Prerequisites for participation (if applicable)				
3	Learning outcomes Students are able to write manuscript draft according to the target journal requirement. Students are able to write proposal draft according to the guideline for writing thesis in Universitas Padjadjaran				
4	Subject aims/Content Scientific Writing and Publication courses are compulsory subjects for Semester I (one) students. Students learn the basic principles of critical and logical thinking, the basic concepts of writing scientific papers. Students are given an understanding of how to read scientific articles and how to cite them using literature citation software. Students are directed to develop research plans and present them. Students are also given an understanding of how to present research results in the form of relevant illustrations through the results of secondary data processing. At the end of the lecture, at least the achievements are tested in the form of a draft proposal and a draft research article (with secondary data) or a review article.				
5	Teaching methods Encounter 1 Study Overview: The purpose and function of Article Encounter 2 Critical Appraisal Journal Citation Reference Management Encounter 3 Identifying Research Problem Logical framework Writing Hypothesis Encounter 4 Background Encounter 5 Method Encounter 6 Results (Data Illustration and Visualization)				

	<p>Encounter 7 Fraud in Research</p>
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9 Discussion</p>
	<p>Encounter 10 Conclusion and Abstract</p>
	<p>Encounter 11 Type of article: Research article and Review Article</p>
	<p>Encounter 12 Introduction of R software</p>
	<p>Encounter 13 Creating study timeline</p>
	<p>Encounter 14 Writing manuscript draft</p>
	<p>Encounter 15 Writing proposal draft</p>
	<p>FINAL EXAMS</p>
6	<p>Assessment methods</p> <p>Encounter 1 – Paper/ – Report – & Discussion</p>
	<p>Encounter 2 – Take home assignment, reading and discussion</p>
	<p>Encounter 3 – Take home assignment, reading and discussion</p>
	<p>Encounter 4 – Take home assignment, reading and discussion</p>
	<p>Encounter 5 – Take home assignment, reading and discussion</p>
	<p>Encounter 6 Take home assignment, reading and discussion</p>
	<p>Encounter 7 Take home assignment, reading and discussion</p>
	<p>MIDTERM EXAM 8</p>
	<p>Encounter 9</p>

	<p>– Take home assignment, reading and discussion</p>
	<p>Encounter 10 – Take home assignment, reading and discussion</p>
	<p>Encounter 11 – Take home assignment, reading and discussion</p>
	<p>Encounter 12 – Paper/Report& Discussion</p>
	<p>Encounter 13 – Paper/Report& Discussion</p>
	<p>Encounter 14 – Paper/Report & Discussion</p>
	<p>Encounter 15 – Paper/Report & Discussion</p>
	<p>FINAL EXAMS 16</p>
7	<p>This module/course is used in the following study programme/s as well Yes</p>
8	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 3. Dr. Sc. Dina Oktavia, S.Hut., M.Si 4. Mas Rizky A. A. Syamsunarno, dr.,M.Kes., Ph.D
9	<ol style="list-style-type: none"> 4. Cargill M., O'Connor P. (2009). <i>Writing Scientific Research Articles: Strategy and Steps</i>. Oxford: John Wiley & Sons Ltd. 5. Gastel, B., Day, R.A. (2016). <i>How to Write and Publish a Scientific Paper</i>. California: Greenwood. 6. Guideline for writing thesis. 2016. Universitas Padjadjaran

