

## COURSES DESCRIPTION

### 1. Islamic Education

Islam Education is 3-credits compulsory course for every Muslim student in all YSU study programs. This course is designed to strengthen their faith and piety to ALLAH The Sacred and The Mighty, as well as broadening the horizons of religious life, so that students formed with virtuous characters, philosophical thinking, rational, dynamic, and broad-minded attitude, paying attention to the demands to respect intra people in one people, and foster harmonious relationship among religious believers. Lecture activities are conducted through lectures, dialogues, and paper presentations. Evaluations are carried out through written assignments, reports, as well as presentations.

### 2. Catholic Education

The Catholic education course directs students to be scholars who believe in Allah according to the Pattern of Jesus Christ who is able to account for their faith and always make it happen in church living and community, becoming 100% Indonesian and 100% Catholic, and embodying Catholicism in harmony with basic values Yogyakarta State University. Students are expected to have an adequate understanding of faith, in accordance with the subjects of the material studied, so that they are able to account for and realize their faith, as Christians who are inclusive, social, and congregational.

### 3. Christianity Education

Christian Education in Higher Education aims for students to consciously make religion as a source of values and guidelines in the development of Christians' personality by upholding human dignity and to realize Christian values in fighting for love, justice, and truth in the family and all aspects of life.

### 4. Hinduism Education

The Hinduism Education is a compulsory pass course for all Hindu students in all study programs. It has 3 credits, with 2 credits of face to face meeting, and 1 credit of practice of Yoga Asanas, and Bhagavad Gita, Sarasamuscaya reading. This course is designed to strengthen sraddha, as well as expand the perspectives of religious life in order to produce broad-minded students with good characters who think in philosophical, rational, and dynamic manners, and practice what must be done accordingly to respect both Hinduism and the harmony of inter religious relation. The learning activities are done through lecture, dialog, presentation, and case study. Assessment is done in the form of written test, mid-term examination (UTS), final examination (UAS), independent assignment, group assignment, as well as presentation.

### 5. Buddhism Education

Buddhism Education contains the concepts and philosophies of Buddhism, the concepts of deity, human happiness, basic moral values, science and technology, politics, and universal laws in Buddhism perspective, exercises on soul development; and scientific paper writing which is in accordance with the fields of study. The materials include: 1) the essence of Saddha and Sanghyang Adi Buddha, The One Almighty God, 2) humans and Buddhism moral foundation, 3) science, technology, and art in the perspective of Buddhism, and 4) society, culture, and politics in the perspective of Buddhism

### 6. Pancasila

This lecture discusses the basis and objectives of Pancasila, Pancasila as a result of scientific thinking, Pancasila in the context of the nation's struggle history, Pancasila as a system of values and national ideology, constitution and amendments of Pancasila, and Pancasila as a paradigm of social and nation life.

#### 7. Civics

Civic Education is a compulsory course for all YSU students taking Bachelor's and Diploma degrees. The course is worth two credits. It provides students with the knowledge and basic skills related to the relationship between citizens and the nation as well as preliminary education to defend the country in order to become reliable citizens for the nation. This course discusses: (1) Citizen rights and obligations (2) Introduction to Country Defense Education (3) Indonesian Democracy (4) Human Rights (5) Archipelago insights as Indonesian Geopolitics (6) National defense as Indonesia Geostrategy (7) National Politics and Strategy as the implementation of Indonesian Geostrategy.

#### 8. Indonesian Language

Indonesian language courses as a General Basic Course emphasize the skills of using Indonesian language that is good and right in the realm of speaking, listening, reading and writing. Through this course students are instilled a sense of love for Indonesian. Students are required to be active in lectures both inside and outside the class because lectures are developed with a student center pattern. Lectures are conducted in various ways, discussions, presentations, assignments, simulations, and PBL (problem based learning).

#### 9. English

This course is designed for first year students to acquire and improve their English language knowledge and skills. It also aimed to prepare them to use English for their professional studies in the university and for their needs in real life and work. This preparatory course will further give the students the opportunity to speak on general topics as well as to communicate in academic environment.

#### 10. Social Culture Education

This course seeks to assist students to grow their awareness of education for encouraging: critical power, creativity, appreciation, and sensitivity of students towards social and cultural values in order to strengthen their personalities as individual and social beings who: (a) are democratic, civilized, and uphold human values, be dignified and care for the preservation of natural resources and the environment; (b) have the ability to master the basic foundations of science, technology, and art; (c) have the ability to master basic concepts of human, culture, value, moral, and law, science, technology, art, and the environment; and (d) play a role in wisely seeking solutions for social, cultural, and environmental problems.

#### 11. Entrepreneurship

This course contains a brief description of entrepreneurship, the basic concepts of entrepreneurship, entrepreneurial processes, functions and role models of entrepreneurship, ideas and opportunities in entrepreneurship, steps in starting a new business and its development, ethics, norms and the spirit of an entrepreneur, strategies and business management, types of business entities, business entity licenses

#### 12. Community Services

KKN is a field course that develops student soft skills in community life, organizes, manages resources, manages differences, builds empathy and concern for the community, formulates plans and implements

activities in groups and independently, in order to improve community welfare. The course consists of: 1. Work program matrix 2. Community ethics 3. Local potential 4. Leadership 5. Community service report.

### 13. Educational Science

This course is compulsory for students enrolled in educational programs. It examines the urgency of education, relation between education and science of education, the foundations of education, education as a system, national education system, lifelong education, educational problems, and educational renewal. To deepen these knowledge and skills, discussion, observation, and reflection are needed. The topics covered in this course include: 1. Urgency of Education; 2. Relation of Education and Educational Sciences; 3. Educational foundations; 4. Education as a system; 5. National Education System; 6. Long-life Education; 7. Educational Problems; and 8. Educational Renewal.

### 14. Educational Socio and Anthropology

This course views education as a socio-cultural process. It provides students with the foundational knowledge on the importance of socio-cultural climate, approaches, and influences, whether from the school or outside the school (family, peer group, nation-community, and mass media) in a multicultural (pluralistic) community, and education that is most suitable with the Indonesian humans (anthropos) in realizing the objective of Indonesian national education at the present and in the future. The topics covered in this course include: 1. Education and the Paradigm of Sociology; 2. Education from the Perspective of Anthropology; 3. Socialization and Character; 4. Social Change and Education; 5. Socio-cultural Capital in Education; 6. School Culture and Education Quality; 7. Educational Problems; and 8. Multicultural Education.

### 15. Education Management

This course discusses the basic concepts, roles, and scope of education management, followed by an in-depth study of management of the field of education management, which includes: students, curriculum, education staff, educational facilities, education funding, management of educational institutions and relationships educational institutions with the community, as well as educational leadership and educational supervision.

### 16. School Field Introduction 1

This course studies aspects of learning and management of education in the education unit, with an emphasis on observation, analysis, and direct appreciation of activities related to school culture, management, and school dynamics as educational and learning development institutions, including: 1. Direct observation of school culture; 2. Observation of organizational structure and work procedures in schools; 3. Observation of the implementation of school rules and regulations; 4. Observation of ceremonial-formal activities at school (for example: flag ceremonies, meetings, briefings); 5. Observation of routine activities in the form of curricular, co-curricular and extracurricular activities; and 6. Observation of habituation practices and positive habits in school.

### 17. School Field Introduction 2

After participating in Teaching Practice II activities, students are expected to be able to strengthen their academic competencies in education and fields of study accompanied by critical thinking skills and higher-level thinking skills through the following activities: 1. examining the curriculum and learning tools used by

teachers; 2. studying the learning strategies used by the teacher; 3. examining the evaluation system used by the teacher; 4. assisting teachers in developing lesson plans, learning media, teaching materials, and evaluation tools; 5. examining the use of information and communication technology in learning; 6. teaching practice with the guidance of supervising teachers and lecturers, with the aim of experiencing the learning process directly, and strengthening the identity of prospective educators; 7. carrying out the tasks of assisting students and extracurricular activities; and 8. assisting the teacher in carrying out the tasks of the teacher administration work.

#### 18. Mathematics and Science Studies

This course discusses the nature of Science, the objects and problem to learn, the relation among science and mathematics, scientific method, scientific attitudes, and ethics, and its application, and scientific presentation and writing style.

#### 19. Basic Biology

Basic Biology discusses the characteristics of biology as a science (body of science: objects, scope of the problem, and the level of life organization), the benefits of biology for human life, how to study and solve biological problems (scientific methods) which include the concept of diversity and unity of organisms, energy conversion and material in biology; complementarity of organisms and the environment, complementarity between structure and function; regulation and homeostasis, inheritance and continuity of life, evolution, behavior, and history of the development of biological concepts.

#### 20. Laboratory Work in Basic Biology

Practicum of Basic Biology examines basic biological problems through observation and or experiments, including: (1) How to find the biological problems based on sensing the various organisms in arounds, (2) Plants and human phenotypic variation, (3) Structure and function of the water and terrestrial frogs, (4) How the relation abiotic and biotic components in different terrestrial ecosystem, (5) How are the human characters inherited, (6) How the body regulate our body temperature, and (7) How the organism show the stereotypic responses

#### 21. Biochemistry

This course discusses the structure and functions of biomolecules, especially carbohydrates, protein and lipids, nucleic acid, coenzyme and vitamin, substances that contribute to the changes of enzyme and its products, as well as metabolism and chemical reaction inside the cell.

#### 22. Laboratory Work in Biochemistry

This course dicusses qualitative and quantitative tests of carbohydrates, protein, lipid, vitamin, and digestive enzyme activities.

#### 23. Cell and Molecular Biology

Cell and molecular biology study the structure and function of the fundamental unit of life, the cell. This subject covering topics relevant to cell structure and function. Selected topics include: Introduction to the Cell, Cell Structure and Function, Cell Macromolecule, Cell Membrane, Nucleus, Ribosomes, Endomembran System, Chloroplast, Mitochondria, Cytoskeleton, Myofilament, Haemoglobin and myoglobin, Hormones, and Immunoglobulin Structure and Function

#### 24. Ecology

The course emphasizes on the understanding of organism existence as a bio system in maintaining its existence. The strategy of maintaining the existence of bio system at various levels of the organizational structure of life through the mechanism of interaction with the internal environment of the population and its external environment. The phenomenon of bio system as an expression of the uniqueness integration of biological structure level of living things in supporting life function. Survivalship is supported by the balance of input and energy availability through the food chain obtained in the food web of life. The food web of life is built on the unique structure and function of ecosystem. The uniqueness of the abiotic and biotic components of structure that build function of ecosystem. The ecosystem functions are based on the biodiversity, food chain, food web, energy flow, and biogeochemical cycle. The uniqueness of every organism in trophic levels ranging from producer, consumer and decomposer that builds trophic structure and ecological pyramid. Various associations and interactions of organisms determine the stability of ecosystem through cybernetic mechanism. Ecosystem classification is categorized by its energy input characteristic. The population size and population dynamic of ecosystem become a variant of ecosystem stability as the realization of their position and function in the ecosystem.

#### 25. Laboratory Work in Ecology

Laboratory Work in Ecology Identifying and analyzing ecosystem components, interacting between ecosystem components, analyzing vegetation using quadrat sampling techniques and point centered quarter techniques and making interpretation of plant community functions in a stand, analyzing plant distribution patterns, recognizing types of organisms in aquatic habitats (rivers , ponds, rice fields, wells, beaches) and study the succession (community change) of protozoa in an artificial system in the laboratory.

#### 26. Environmental Science

This course discusses the awareness of environmental problems, interaction between biophysic environment and its function in sustainable development, wasteless technology, new paradigm on environment management and short term solution for environmental problems.

#### 27. Laboratory Work in Environmental Science

This course discusses the components of environmental system and its relationship, real problems and solutions including studying about natural and artificial environmental systems, water pollution and group projects.

#### 28. Marine Biology

This course develops scientific and analytical skills in the estuarine and marine ecology ecosystems through discussion, observation, and presentation.

#### 29. Laboratory Work in Marine Biology

This course develops scientific and analytical skills in the estuarine and marine ecology ecosystems through discussion, observation, and presentation.

#### 30. Evolution

In this course, students learn the notions, the concepts of the theory of evolution and the development of theories from Pre-Darwin to the Post Darwinism. Variations of living things as raw materials for evolution,

phylogeny, species and speciation are material whose discussion is inseparable from the mechanism of evolution in a holistic manner. As a supporting fact to better understand the evolution of living things, evolutionary clues are also discussed. The evolution of invertebrates, plant evolution, primate evolution and Humans is material that is associated with discussions of technological developments. To broaden the horizons of students, it is also necessary to discuss the pros and cons of the theory of evolution.

#### 31. Laboratory Work in Evolution

This course contains a study of the evolutionary process in living things and their environment. It includes the study of the origin of the universe, the evolution of the earth and the environment, especially about sea water, patterns of evolution of humans and primates, patterns of mammalian evolution, evolutionary patterns of reptiles and amphibians, evolution patterns of Aves and invertebrate evolution patterns. The study of the fossilization process and the method of measuring the age of fossils, a study of Sangiran soil and its premodern formations, a study of the migration and dispersal of *Homo erectus* in the world. Students also examine the evidence of evolution in the museum. They also observe the evidence of evolution in the field directly.

#### 32. Organism Behavior

This course contains a study of the behavior of organisms. It includes the scope of organism behavior, approach to study and development of scientific behavior of organisms, patterns of organism behavior and, research methodology of organism behavior. The behavior patterns of the organisms studied include: biorhythms, orientation and navigation behavior, reproductive behavior, eating and predation behavior, self-defense behavior, migration and dispersal behavior, social and group behavior. Students also review research into organism behavior through the latest journals. Students observe behavior by using videos and direct observation.

#### 33. Biometry

This course contains the application of statistics to analyze biological research data which includes the application of data analysis using descriptive statistical analysis techniques, inferential statistical analysis parametric and nonparametric.

#### 34. Laboratory Work in Biometry

Implementing statistics to analyze biological research data includes the application of descriptive statistical analysis techniques, parametric and nonparametric inferential statistics.

#### 35. Biology Learning and Curriculum

This course examines the development of the biology curriculum and its learning, including: the nature of the biology curriculum and its characteristics (including the understanding, components and structure of the curriculum), the development of a biology curriculum (including understanding, principles, approaches, models, and steps in curriculum development), biology curriculum planning (including understanding, components, system approach and needs orientation in curriculum planning), biology learning in curriculum implementation (including learning systems, learning and teaching, and learning strategies), evaluation of biology curriculum (including understanding, kinds of and curriculum evaluation steps), and the secondary school curriculum (including competency-based curriculum / education unit level curriculum 2004/2006 (KBK / KTSP) and 2013 curriculum).

#### 36. Biology Learning Strategies

This course discusses framework and plans that will be carried out by the teacher in teaching and learning activities, assessment, and follow-up action. These plans include teaching and learning models, approaches, methods, or techniques that will be selected and used in biology teaching. Plans and framework also include a variety of learning media and materials that will support learning success in certain materials and learning outcomes.

#### 37. Laboratory Work in Biology Learning Media and Information Technology

This course focuses on the study of the basic principles and practices of developing biology and IT learning media, which include: 1) the nature, position and role of media and IT in biology learning, and its relation to TPACK principles in biology learning, 2) multiple principles representation in learning media and its relevance to the characteristics of biological studies, 3) the variety and characteristics of biology learning media, 4) project development and production of media and IT for biology learning in schools.

#### 38. Biology Learning Assessment

This course contains the principles and the application and techniques for measuring, evaluating, and evaluating biology learning. It is designed to train students related to the skills to design and develop measurement and assessment instruments used in biology learning, both for the needs of Classroom Assessment as well as for other needs such as National Examination and research, and can apply the results of the assessment to evaluate biology learning.

#### 39. Laboratory Work in Biology Learning Assessment

This practicum helps students to master the techniques of measurement, assessment, and evaluation of biological learning, skilled in designing and developing measurement and assessment instruments used in biology learning, both for Classroom Assessment needs as well as for other needs such as national examination and research, and this can also help them apply the assessment results to evaluate biology learning.

#### 40. Plant Diversity

This course discusses the nature of plant diversity and its scope, supporting factors for plant diversity, classification of plants, plant nomenclature, algae diversity, diversity of moss plants, diversity of ferns, diversity of open seed plants and diversity of closed seed plants.

#### 41. Laboratory Work in Plant Diversity

In this laboratory work, students identify and describe the characteristics of plant objects which include: Schizophyta, Thallophyta, Bryophyta, Pteridophyta and Spermatophyta, reviewing the nomenclature system and the use of determination keys in determining plant names, and compiling simple determination keys.

#### 42. Animal Diversity

This course mainly develops scientific and skill abilities (MKK), so that this lecture emphasizes the understanding of the principles of diversity, and the relationship of phylogeny between phyla in kingdom Animalia, and its relation to human life. The topics in this course are emphasized on animal examples found around students.

43. Laboratory Work in Animal Diversity

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44. Plant Functional Structure

This course discusses the structure of the anatomical structure of the plant body and its characteristics in relation to the physiological role or function of the plant body, through theoretical and laboratory studies related to environmental factors (adaptation and regulatory systems).

45. Laboratory Work in Plant Functional Structure

This course discusses the morphological and anatomical structure of plant (cell, Tissues and organs) and its characteristics in relation to the role of physiological function, through theoretical and laboratory studies connected to the environmental factors (adaptation).

46. Animal Function Structure

This course discusses the awareness structure and fungsi of tissue (epithelial, textus conectivus, muscle and nerve), organ and systemic, homeostasis process and sistemic disorder mechanism

47. Laboratory Work in Animal Function Structure

48. Reproduction and Embryology

This course mainly develops skills in the field of science and skills (MKK) at the scope of reproductive issues and embryology, both in animals and plants.

49. Laboratory Work in Reproduction and Embryology

The course mainly develops the ability to conduct facts laboratory observation in the field of reproduction and embryology, both in animals and plants.

50. Microbe Diversity

In this course, students study about the structure of microbial diversity, the group of microorganisms, their evolutionary history, and their main characteristics, cell structure of microorganisms and viruses, classification, nutrition, metabolism, microbial genetics and growth and the role of microorganisms in human life.

51. Laboratory Work in Microbe Diversity

Practicing skills in applying basic techniques in studying microorganisms, including aseptic techniques, isolation techniques from mixed culture of microorganisms, phenotypic characterization and bacterial identification; counting bacteria and designing experimental designs related to the role of microorganisms, especially bacteria.

52. Human Biology

This course discusses the human body with a systematic approach including the structure and function, biological variation, growth, and adaptation, in supporting the processes and functions of physiological cells



and organs and the interaction of various organs in maintaining the homeostasis of the system. This course is also designed to assist students in developing talents, skills and skills related to the application of Human Biology in the analysis of health cases related to the pathology of the human body system.

53. Laboratory Work in Human Biology

Varieties of Human Morphology/Somatoscopy Dermatoglyphics, eyesight, skeleton & reflexes, hearing, smell, thermoregulation, tactile, blood pressure meter (Sphygmomanometer), HCG test, spirometry, and electro radiograph.

54. Biotechnology

The course discusses the fundamental issues on biotechnology, recombinant DNA technologies and techniques for molecule analyses, biotechnology application, as well as biosafety and bioethics.

55. Laboratory Work in Biotechnology

Bioethanol production through bio-material fermentation, Recombinant DNA Technology, DNA analysis and amplification, bioinformatics.

56. Laboratory Management

This course discusses: (1) Definition, position and function of laboratories as a support for the learning process of biology; (2) Planning and managing buildings, greenhouses, gardens, cages and experimental ponds; (3) Biological laboratory supporting facilities; (4) Laboratory administration; (5) Laboratory expenditure budget; (6) Personnel; (7) Necessarily use of laboratory equipment; (8) Security occupational safety and health at the laboratory work.

57. Biology Education

The course discusses the component of biology education science, the function of teacher, pedagogical knowledge of teaching biology, content knowledge of biology, technological knowledge of biology, and the learners and learning biology.

58. Biology Research Methodology

This course contains the nature, principles, and procedures of conducting research in the field of Biology, based on the characteristics of the population that has normal distribution or population which has an unknown distribution in the form of monivariate and bivariate descriptive design (observation and ex-post) and design bivariate experiments along with examples of problems that can be solved and also including the reporting.

59. Laboratory Work in Biology Research Methodology

The application of research principles and procedures in the field of Biology, both based on the characteristics of populations that are normally distributed and unknown distribution in the form of descriptive and experimental research designs and their reporting.

60. Biology Education Research Methodology

This course contains the educational research paradigm along with research principles and procedures in the field of Biology Education, both based on the quantitative positive paradigm through descriptive research design (survey, observation, post-facto), experimental research (pre-experimentation, actual experiments, quasi-experiments), design & development research (D & DR), research and development (R

& D), and research that uses the naturalistic qualitative paradigm through classroom action research, qualitative phenomenological research, case studies, grounded research, along with examples of problems that can be solved and their reporting.

61. Laboratory Work in Microtechnique

This course will conduct the students have the skills to use laboratory equipment and recognize the properties of chemicals used in biology laboratories, understand the use of microscopes correctly, and are skilled at making semipermanent and permanent microtechniques preparations.

62. Laboratory Work in Laboratory Management

This course conduct the student to learn the basic skills and work abilities in using laboratory equipment, include: introducing names and specifications of biological laboratory equipment and their functions, skills using various laboratory measuring devices, techniques for transferring chemical solutions, various heating devices and techniques, making chemical solution and dilution, using optical devices, equipment storage techniques, making biological objects and preservation, maintaining laboratory equipment (calibration and repair), and techniques for analyzing biological materials / environment for making learning media.

63. English for Biology

This subject trains students to practise using English terms and expressions mostly used in Biology, both in speaking and writing, which relate to property and shape, location, structure, measurement, function and ability, actions in sequence, quantity, cause and effect, proportion, frequency, tendency, probability, methods, and consolidation.

64. English for Biology Education

This course discusses contemporary issues on biology education that underpinned on critical review of the study as well as empirical research. Besides this main topic, this course also focuses on the improvement of English communication skills that expected to be achieved by students, especially on reading, speaking and writing skills.

65. Biology Education Seminar

This course discusses the basic principle of the research methodology in biology and biology education, elements of research methodology to be used in biology education research, oral communication for delivering of ideas and thoughts related to research in biological education, and written communication for delivering of ideas and thoughts related to research in biological education.

66. Microteaching

This course trains the biology teaching skills of the students by implementing peer teaching. The activities include observation of biology schooling and learning in schools (SHS), analysis / review of learning devices that develop in schools, compiling learning tools that include lesson plans, material analysis, LKPD, learning media, and assessment instruments, conducting partial and integrated teaching exercises limited in the form of peer teaching.

67. Microteaching

This course contains how to design and implementing activities in the field, starting with the determination of locations, objects, field surveys and skills training needed.

68. Final Assignment

This course consists of the guidance in writing thesis or final assignment starting from the research design, implementation, data collection, data processing, data analysis, reporting the research findings, as well as writing the article and other research products for seminars, and revision.

69. Mycology

This course discusses the structure of mycology, the characteristics and structure of fungi, fungi diversity, classification, nutrition, metabolism, growth and roles of fungi in the life of human.

70. Laboratory Work in Mycology

This course discusses some basic techniques in learning the object of mycology including aseptic technique; fungus development; tools and materials for practicum; fungus isolation, characterization and identification; and fungus calculation.

71. Plant Tissue Culture

This course discusses the basic concept of tissue culture, including the history of development, lab facilities for tissue culture, the principles of sterilization, the types and purposes of tissue culture, preparation and composition of medium nutrition, explant and tool sterilization, internal influence of explant-source plant to growth and tissue development, influence of physical factors to tissue growth and development, embryo and protoplasm culture.

72. Laboratory Work in Plant Tissue Culture

This course discusses the types and functions of each tools needed for tissue culture lab; room and tool sterilization; planning to make stock and media for plant tissue culture; the germination of seeds using in vitro culture; and embryo culture from orchid seeds.

73. Demography and Environmental Education

This course puts the emphasis on personality development through discussion on the interrelation between the resident factor (human) and the environment factor in the form of actual discussion (topic) in daily life, i.e. human life in its relation to energy and natural resources, water, air, and land. The next development is the discussion on environmental damage caused by human behavior, what they need to do as a form of responsibility for sustainable life, and nature preservation in the discussion of environmental ethics. The pinnacle of the development is the discussion on the problems faced by the nation of Indonesia in regard to its interaction with the regional and global environments.

74. Tropical Biology

This course discusses the scope and basic concepts of tropical biology, the structure and function of tropical forests in terms of the flora, fauna and microbiota of tropical forests, the characteristics and characteristics of tropical forests, the dynamics of tropical forest ecosystems, the interaction of flora, fauna and microbiota. Analysis of vegetation, classification and classification systems of tropical forests, problems of tropical forests and their use, exploitation in tropical forests, management and preservation of tropical forests as life support.

#### 75. Molecular Genetics

This course develops science in a more profound way in the molecular field specifically related to genetics or inheritance in living things. The material covered includes: (1) Proof of DNA as Carrier of Genetic Material (2) Genes and Biological Information (3) Structure of DNA and RNA (4) Changes in Genetic Material (5) Function of Genes (6) Molecular Mendelic Genetics (7) DNA Replication (8) Genomes in prokaryotes and eukaryotes (9) Human Genomes (10) Transcription (11) Translations (12) Regulation of Gene Expression in Prokaryotes and (13) Regulations for Gene Expression in Eukaryotes.

#### 76. Immunology

This course discusses the awareness of Immunology problems, interaction between biophysics environment and its function in sustainable development, wasteless technology, new paradigm on environment management and short term solution for environmental problems.

#### 77. Laboratory Work in Immunology

This laboratory work of Immunology provide the problems, interaction between biophysics environment and its function in sustainable development, technology, new paradigm on immunology and short term solution in daily live.

#### 78. Limnology

This course develops scientific and analytical skills in the aquatic ecosystems through discussion, observation, and presentation.

#### 79. Laboratory Work in Limnology

This course develops scientific and analytical skills in the aquatic ecosystems through discussion, observation, books and journal reviews, and presentation.

#### 80. Nutrition and Health

This course discusses the fulfillment of human nutrition in order to maintain health and improve health by managing the environment. This course is also to assist the development of problem-solving skills related to the application of Nutrition and Health in the analysis of health cases relating to the conditions of nutrition acquisition and various diseases that often occur in the population of Indonesia.

#### 81. Laboratory Work in Nutrition and Health

This course discusses developing work skills in solving nutrition and environmental health problems in the community using the group project method. In addition, the implementation of a diet record and introduction of 10 diseases in the health center where each student lives.

#### 82. Arthropods Biology

This course mainly develops scientific skills so this course the emphasis is on understanding the principles of diversity and unity, ecology, phylogeny kinship between Arthropoda sub Phyla and its relation to human life.

#### 83. Laboratory Work in Arthropods Biology

This course mainly develops laboratory scientific skills so this course the emphasis is on understanding the principles of diversity and unity, ecology of Arthropoda, by handling, observing, classifying and reporting the result in paper/articles or presentation.

84. Biology Learning Material Development Workshop

This course examines the development of biology teaching materials including: the scope of learning resources, identification of various kinds of biological learning resources, identification of objects and biological problems based on local potential, steps to appoint research results as a source of learning biology, characteristics of biology teaching materials, development of materials in the biology teaching in the form of handouts, development of module teaching materials (characteristics, types, and systematics modules), textbooks, comic teaching materials, and computer-based teaching materials.

85. Biology Learning Result Development

This course discusses about basic principle of the mastery learning, teacher's steps as a follow-up for students who do not achieve mastery learning, remedial program: principles and forms of implementation, basic principle for selecting models, materials, and/or learning media in the Remedial Program, steps in remedial program: case study on biology teaching and learning, and enrichment program: principles and forms of implementation.

86. Laboratory Equipment Maintenance and Repair Workshop

This course provides students with hands on activity experience to take care and repair laboratory equipment, especially in biology laboratories. Equipping students with experience and recognizing: Definition of care, type of care, corrective care, unplanned maintenance, purpose of laboratory maintenance, laboratory care system, management of laboratory equipment and materials, objects of laboratory care, laboratory care system resources, equipment for care in laboratories, tool maintenance and calibration, how to store biological laboratory equipment and materials and sources of equipment and material damage.

87. Outdoor Biology Learning

This course contains the study of biology learning outside the classroom. This includes Adventure Based Learning Progress (ABLP) and Experiential Learning (EL) as the basis for learning and is supported by Technological Pedagogical Content Knowledge (TPACK) in its implementation. It trains students and provides them with experience in conducting field studies that require the introduction of specific biological objects.

88. Instructional Design Development Workshop

This course discusses ISD, models of ISD, a biological topic and relevant ISD, developing ISD in a certain topic of biology, and evaluating effectiveness of ISD.

89. Biology Laboratory Work safety and Health

This course develops students' understanding in the concept and function and biology laboratory work safety and health, decree in laboratory work safety and health, potential risk in laboratory, possible accident in laboratory, self-protection tools in laboratory, first aid in laboratory, diseases caused by working in biology laboratory, the application in biology laboratory work safety and health.

90. Academic Writing for Biology Education

This course discusses 1) ICT, Web sites, and information on biology, 2) Mendeley and writing management application, 3) Paragraphs and writing a paragraph, 4) Article and how to write a scientific article, 5) Research proposal, and 6) Presenting research results.

91. Biology Learning Models Workshop

This course discusses teaching methods, teaching models, teaching approach, behaviorism vs cognitivism, 4 BSCS's biology learning approaches, scientific approach, PBL, and PJBL.

92. Selected Topics on Biology Education

This course discusses about national regulations and/or policies related to education, urgency in the use of information and communication technology in teaching and learning on biology, and principle of using information and communication technology in learning biology.

93. Biology Education Research Instrument Workshop

This course contains principles and procedures for developing research instruments in the field of Biology Education, both in the forms of test and non-test as well as procedure standardization from the perspectives of validity and reliability.

94. Selected Topics on Biology Education Research

This course contains an in-depth study of designs, implementation, and reports of Biological Education research presented in reviews of research published in national and international journals on curriculum, learning process, assessment, and evaluation in the field of Biology Education. The course focuses on analyzing research from the perspective of the design, namely surveys, observations, experiments, D&DR, and Classroom Action Research.

95. Biology Education Research and Development Workshop

This course discusses rational, basic, and urgency of Research and Development or R&D in biology education, designing research and development for biology teaching and learning.

96. Class Action Research Workshop

Action research is a process of inquiry and reflection in which educators examine their personal instructional practice systematically, using the techniques of research. This online course addresses concepts associated with action research and the processes and procedures for conducting action research, culminating in the development of an action research plan.

97. Article Writing and Research Findings Poster Development Workshop

This course discusses 1) Quantitative research design in biology education; 2) Qualitative research designs in biology education; 3) Write scientific article; 4) Scientific poster; and 5) Writing article management (Mendeley).

98. Biology Learning Computer Application Workshop

This course focuses on the students' skills on understanding, designing and developing of computer-based biology instructional media. The discourses will be discussed including: the characteristic of computer-based biology instructional media, the principle of multiple representations on computer-based biology

instructional media, and applications which useful for developing computer-based biology instructional media.

99. Audio Visual Media Production Workshop

This course deals with how biology instructional media in the form of audio visuals are produced in accordance with the needs of biology learning. Therein, research and development (R&D) on producing learning media and audio visual editing applications for the instructional media are discussed. It also requires students to review and design the media assessment and validation instruments.

100. Print Media Production Workshop

This course deals with how to produce biology instructional media in the form of printed materials based on the needs of biology learning. The steps in research and development (R & D) in producing instructional media and the editing softwares or applications for managing the media layouts are discussed. It requires students to review and design media assessment and validation instruments, as well as review and submit a book and ISBN data requests to the National Library.

101. Preservation Techniques of Biological Objects

This subject trains students to make whole dry and wet preservation of biology objects, whole preservation of microscopic biology objects, slide preparation of biology objects, and skeleton preservation of animals.

102. Biotourism Workshop

This course examines sustainable development in a tourism area that promotes conservation and ecosystem sustainability. Students shall master the techniques of tourism facilitation and guide based on Biology. The aspects included in the Biotourism guide are reviews on equipment needed to support Biotourism in an area, so the students are able to conduct EcoEduTourism.

103. Work Safety and Health

This course discusses the definition and function of OSH, laws governing OSH, potential hazards at work, workplace accidents, personal protective equipment, first aid in accidents, occupational diseases, and the application of OSH.

104. Biology Education Business Incubation

This lecture discusses Understanding and business incubator linkup space Biology Education, tenant criteria (business venture): (Micro, Small and Medium Enterprises), Minimum Requirements for Business Management & Establishment of Business Incubator, Working Principle of Business Incubator, Form of Incubator & Operasionalisas, Stages of Incubation, entrepreneurial motivation, criteria Business incubator for selecting tenant candidates, Financial & Marketing Resources, Work & Funding Design, UMKM (Micro, Small and Medium Enterprises) partnership pattern, Initial Capital and Match through Incubators.

105. Business Management

This lecture discusses business objectives, business environment, types of ownership in business, definition of global business, business management and types of organizational structure, and it is expected that

students will also be able to analyze the learning functions of management related to HR management, Operations, Marketing, Finance and Managerial Tools in the company in running its business.

#### 106. Applied Biology

This course discusses the awareness of the application and utilization of biology in agriculture (including food crops and horticulture), livestock, health, environmental and energy, and industrial fields; and its prospects in the future.