USK
UNIVERSITAS
SYIAH KUALA

Kampus Merdeka
INDONESIA JAYA

CURRICULUM BOOK

2024-2028

Based on The Rector's Decree
No. :7777/UN11/KPT/2024

Bachelor in Statistics Study Program

FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS SYIAH KUALA

CURRICULUM

STATISTICS
STUDY PROGRAM

(UNDERGRADUATE)

UNIVERSITAS SYIAH KUALA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DARUSSALAM 2024

STUDY PROGRAM IDENTITY

Program Specification

1	Name of Institution	*Universitas Syiah Kuala*
2	Name of Study Program	*Statistics*
3	Level of Education	*Undergraduate*
4	Address	*Faculty of Mathematics and Natural Sciences (FMIPA) Building, Block C, 2nd Floor Kopelma Darussalam, Banda Aceh, 23111 Aceh, Indonesia*
5	Accreditation Status and Accrediting Body	*Accredited Excellent by the Independent Accreditation Institute for Natural and Formal Sciences (LAMSAMA)*
6	Degree Title/Awarded Qualification	*Bachelor in Statistics (S.Stat.)*
7	Duration of Study and Number of Credits Earned in ECTS	*4 Years and 144 SKS*

UNDERGRADUATE PROGRAM IN STATISTICS PROGRAM PROFILE

The Undergraduate Program in Statistics was established on August 24, 2012, under the Faculty of Mathematics and Natural Sciences (FMIPA), Syiah Kuala University (USK), by Decree No. 279/E/O/2012. Starting from the 2013/2014 academic year, the program began admitting students for the degree of Bachelor of Statistics (S.Stat). Meanwhile, the Department of Statistics was formally established on August 3, 2018, under the same faculty through Rector's Decree No. 1743/UN11/KPT/2018. The Statistics Program operates under the Department of Statistics.

This program is supported by a team of 20 lecturers, including 7 with doctoral degrees (Ph.D.) and 13 with master's degrees (M.Sc.). The teaching staff are graduates from leading universities both in Indonesia and abroad, such as Germany, the United States, Taiwan, the United Kingdom, and Thailand. Two faculty members have been awarded the title of Professor, while two lecturers with master's degrees are currently pursuing doctoral studies.

To support teaching and research, the Undergraduate Program in Statistics provides a range of modern laboratory facilities. These laboratories are equipped with additional hardware to support heavy data processing and high-performance computing. Adequate network infrastructure is also available to handle complex statistical data analysis. There are five laboratories focusing on various statistical fields: Basic Statistics and Statistical Modeling Laboratory, Survey and Data Processing Laboratory, Computational and Statistical Programming Laboratory, Biostatistics Laboratory, and Econometrics Laboratory.

In addition to laboratory facilities, there are also seminar rooms, research groups, and areas of interest that enable students to engage in in-depth discussions, collaborative research, and development of specialized skills in statistics. These groups include SPARG (Survey and Policy Analysis Research Group), BIOSRG (Biostatistics Research Group), CASRG (Computational Statistics Research Group), and BISRG (Business and Industrial Statistics Research Group).

The Undergraduate Program in Statistics at FMIPA USK has produced successful and accomplished graduates, many of whom hold positions as data analysts, data scientists, consultants, survey implementers and analysts, and more, across various sectors including ministries, local governments, private companies, and state-owned enterprises. Some graduates have also chosen academic careers, continued their studies and become lecturers at reputable universities. The program's quality education, supported by qualified faculty

and well-equipped laboratories, provides students with the skills and knowledge necessary to succeed in the workforce and contribute significantly to the advancement and application of statistics in Indonesia.

The Undergraduate Program in Statistics continues to grow and strives to provide the best services for all stakeholders. Its 2025–2035 vision is to become "**a center of excellence in education, research, and application of statistics that is globally relevant for sustainable development, by producing future academics, researchers, practitioners, and entrepreneurs in statistics and data science who are innovative, independent, and prominent by 2035**."

Curriculum Development Team Decree
(Decree on the Appointment of the Curriculum Development Team
for the Study Program)

PREFACE

The development and revision of the curriculum is a crucial step in ensuring the academic quality of a study program. It aims to prepare students with competencies aligned with the advancement of science and technology (IPTEK), and to equip them to face increasingly complex and competitive challenges in the era of globalization. In this context, it is essential to align the study program curriculum with current developments such as the Industrial Revolution 4.0, the Independent Learning Independent Campus (MBKM) policy, the Ministry of Education, Culture, Research, and Technology Regulation No. 53 of 2023 on Quality Assurance in Higher Education, and the legal status of Universitas Syiah Kuala (USK) as a state university with legal entity status.

Curriculum revisions across all study programs within the Faculty of Mathematics and Natural Sciences (FMIPA) at Universitas Syiah Kuala follow the Outcome-Based Education (OBE) approach. This approach ensures that the curriculum is designed to achieve clear and measurable learning outcomes. Teaching methods in the OBE framework emphasize that every learning activity must have specific, measurable goals that are relevant to professional practice. As such, all elements of the curriculum, assessment, and instruction are aligned with the intended learning outcomes.

The current OBE-based curriculum has been developed with consideration of various aspects, including the Regulation No. 53 of 2023, the Indonesian National Qualifications Framework (KKNI), the MBKM policy, advancements in science and technology, and input from relevant stakeholders such as academic associations, government agencies, industry partners, and alumni. However, we acknowledge that this curriculum development process is not without its limitations. Therefore, we sincerely welcome constructive feedback and suggestions to improve the curriculum in the future.

We extend our gratitude to the department heads, program coordinators, curriculum development team, and all parties who have contributed and supported the curriculum revision process. We hope that the resulting curriculum will provide meaningful benefits to the students and graduates of FMIPA USK.

Darussalam, 6 Mei 2024
Dekan,

Prof. Dr. Taufik Fuadi Abidin, S.Si., M.Tech.

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CHAPTER 1
INTRODUCTION

The development and implementation of curriculum at the higher education level is an autonomous right that involves planning, course content, learning processes, and assessment. The Faculty of Mathematics and Natural Sciences, particularly the Department of Statistics at Syiah Kuala University, periodically reviews its curriculum by monitoring scientific developments and incorporating input from various stakeholders such as academic associations, government, industry, and alumni. This ensures responsiveness to current advancements and the needs of stakeholders in the era of the Industrial Revolution 4.0.

1.1 Curriculum Document Development Process

The curriculum of 2024 was developed following a series of structured stages, beginning with the formulation of the study program's vision, mission, strategy, and objectives. These foundational elements guide the design of a curriculum that aligns with educational goals and societal needs. The next stages involve defining the graduate profile, identifying the expected competencies of graduates, and formulating the Intended Learning Outcomes (ILOs) to measure the achievement of educational objectives.

Furthermore, the process includes determining the body of knowledge, Course Learning Outcomes (CLOs), and Sub-course Learning Outcomes (sub-CLOs), which collectively serve as the foundation for the curriculum structure. Each course is detailed with a description, credit points (SKS), and course code, and is accompanied by a Semester Learning Plan (RPS), assessment rubric, and course contract to ensure clarity and consistency in learning and assessment processes.

The curriculum development process was conducted systematically and in accordance with predetermined stages to ensure the delivery of high-quality and relevant education.

In the Statistics Study Program, the curriculum development process involved four key steps: evaluating the existing curriculum, designing the new curriculum, planning the learning process, and evaluating the learning program. This process began with the formulation of Intended Learning Outcomes (ILOs) and proceeded to the identification of applicable subject matter.

The first step included conducting tracer studies and several focus group discussions (FGDs) with relevant stakeholders. A special committee was formed to draft the new curriculum, which involved reviewing regulations from the Ministry of Education, Culture, Research, and Technology as well as Syiah Kuala University. The curriculum team then identified the relevant subject matter, defined learning outcomes, and formulated courses along with the associated RPS, course contracts, and assessment rubrics.

The new curriculum adopts both the Independent Learning Independent Campus (MBKM) framework and the Outcome-Based Education (OBE) model. The process also includes synchronization of shared foundational courses and alignment with the vision and mission of the university and faculty.

The final step includes preparing the curriculum layout, obtaining approval from the Rector of Syiah Kuala University, and uploading the finalized curriculum to the official website of the Statistics Department, ensuring transparency and sustainability in accordance with prevailing guidelines and regulations.

1.2 Curriculum Evaluation and Tracer Study

This subsection contains the following parts:

A. Results of Curriculum Implementation Evaluation

The Statistics Study Program initially implemented the 2011 Curriculum, following the policy of the Faculty of Mathematics and Natural Sciences since the program's establishment in 2012. Subsequent curriculum updates have been carried out periodically due to changes in society, the strategic environment, and the advancement of science and technology. In 2016, the curriculum was revised again, considering government regulations on the National Standards for Higher Education (SNPT) and the Indonesian National Qualifications Framework (KKNI).

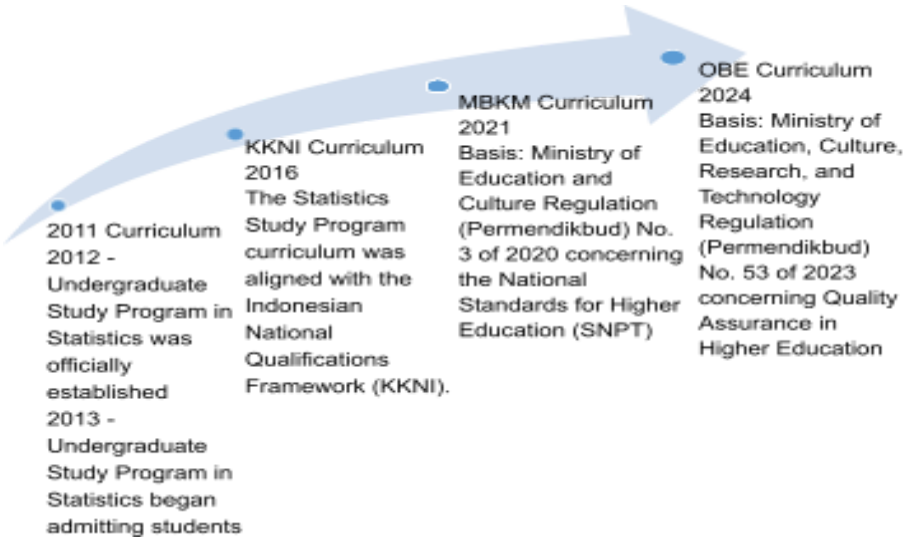

Figure 1. Curriculum Development of the Undergraduate Statistics Study Program, FMIPA, USK

A review of the 2016 curriculum at the Faculty of Mathematics and Natural Sciences, particularly regarding the implementation of the “Independent Learning Independent Campus (MBKM)” policy, became the foundation for the curriculum reform in 2020/21. This reform led to the development of a new curriculum, the Outcome-Based Education (OBE) Curriculum, which is set to be implemented starting in the 2024/25 academic year.

B. Rationale for the Curriculum Revision

The curriculum revision of the Statistics Study Program is aligned with regulations such as the Regulation of the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia Number 53 of 2023 and the Regulation of the Minister of Education and Culture Number 3 of 2020. These changes are grounded in several key factors, including the needs of stakeholders based on the latest tracer study, internal and external policy changes in response to current conditions, and alignment with the vision and mission of both Syiah Kuala University (USK) and the Faculty of Mathematics and Natural Sciences (FMIPA). The revisions encompass aspects of the Outcome-Based Education (OBE) curriculum, updates in the implementation of the MBKM policy, and character development through literacy in data, technology, and humanity. Furthermore, the curriculum design also adapts to the era of disruption and the Fourth Industrial Revolution, with a focus on developing 4.0 technologies such as artificial intelligence (AI), robotics, the Internet of Things (IoT), and big data, while also preparing for the transition toward Society 5.0.

C. Formulation of the Curriculum Revision

The OBE (Outcome-Based Education) curriculum is expected to accommodate the development of 21st-century skills. The learning focus shifts toward complex competencies such as problem-solving through innovative assignments. Character development includes emotional intelligence, spiritual awareness, and psychological resilience. Process skills involve logical thinking, introspection, and the ability to accept feedback for improvement. System skills cover decision-making based on evaluating alternative solutions. Leadership training is embedded in project-based tasks and student development activities. Cognitive skills include alternative thinking, creativity, problem sensitivity, and the ability to visualize processes. Collectively, these are referred to as the 6C character traits: Creative, Critical, Collaborative, Communicative, Compassionate, and Computational Thinking.

The curriculum revision from the previous version includes adjustments to the structure of learning materials, more interactive and holistic teaching and assessment methods, updates or enhancements to practicum or internship programs, and a stronger emphasis on soft skills development. These revisions aim to enhance the relevance of course content to scientific advancements and labor market demands, while also providing students with enriched learning experiences aligned with the latest needs of industry and research.

1.3 Foundations for Curriculum Design and Development

Several legal frameworks serve as the foundations for curriculum design and development, including:

1. Law of the Republic of Indonesia No. 20 of 2003 on the National Education System; and Law No. 12 of 2012 on Higher Education;
2. Government Regulation No. 4 of 2014 on the Organization of Higher Education and the Management of Higher Education Institutions;
3. Presidential Regulation of the Republic of Indonesia No. 8 of 2012 on the Indonesian National Qualifications Framework (KKNI);
4. Regulation of the Minister of Education, Culture, Research, and Technology No. 53 of 2023 on Quality Assurance of Higher Education;
5. Regulation of the Minister of Education and Culture No. 5 of 2020 on National Standards for Higher Education;
6. Regulation of the Minister of Education and Culture No. 5 of 2020 on Accreditation of Study Programs and Higher Education Institutions;
7. Regulation of the Minister of Education and Culture No. 7 of 2020 on the Establishment, Amendment, and Dissolution of Public Universities, and the Establishment, Amendment, and Revocation of Licenses for Private Universities;
8. Regulation of the Minister of Education and Culture No. 22 of 2020 on the Strategic Plan of the Ministry of Education and Culture for 2020–2024;
9. Decree of the Minister of Education and Culture No. 754/P/2020 on Key Performance Indicators (KPI) for Public Universities and Higher Education Service Institutions within the Ministry of Education and Culture in 2020;
10. Regulation of the Minister of Education and Culture No. 32 of 2019 on General Guidelines for the Distribution of Government Assistance in the Ministry of Education and Culture;
11. The 2024–2028 Curriculum Development Guidebook.

CHAPTER 2
SCIENTIFIC VISION, OBJECTIVES, AND STRATEGIES OF THE STUDY PROGRAM

2.1 Scientific Vision and Mission of Study Program

2.1.1 Scientific Vision

Table 1. Comparison of the Vision of the Study Program, Faculty, and Syiah Kuala University

Vision of the Bachelor's Study Program in Statistics	Vision of the Faculty of Mathematics and Natural Sciences	Vision of Universitas Syiah Kuala
To develop the Study Program in Statistics as a center of excellence in education, research, and application of statistics that is relevant to global sustainable development by preparing prospective academics, researchers, practitioners, and entrepreneurs in the fields of statistics and data science who are innovative, independent, and outstanding by 2035.	To become an innovative, independent, and globally leading socio-sciencepreneur faculty by 2035.	To become an innovative, independent, and globally leading socio-technopreneur university.

Table 2 Alignment of the University's and Faculty's Vision with the Vision of the Study Program

Keywords of the Study Program Vision	Alignment of the Study Program Vision		Description of Alignment
	Faculty Vision Keywords	University Vision Keywords	
Excellence	Prominence	Prominence	
Relevance	Prominence, Innovative	Innovative, Independence	To be prominent and innovative, it is essential to maintain relevance.
Sustainability	Independence	Independence	To be independent, it is necessary to ensure sustainability.
Global	Global	Global	
Innovative, Independence, Prominence	Innovative, Independence, Prominence	Innovative, Independence, Prominence	
Entrepreneurship	Entrepreneurship	Entrepreneurship	

2.1.2 Mission of the Undergraduate Study Program in Statistics

1. To advance education in the field of statistics through the implementation of an Outcome-Based Education (OBE) curriculum that integrates socio-technopreneur competencies and character development;
2. To promote scholarly inquiry, research, community service, and the application of knowledge and its practical uses for sustainable global development;
3. To foster mutually beneficial partnerships with stakeholders both domestically and internationally in support of achieving the Sustainable Development Goals (SDGs);
4. To develop areas of specialization in statistics and their applications in (a) Official Statistics and Public Policy, (b) Business and Industrial Statistics, (c) Computational Statistics, and (d) Biostatistics;
5. To cultivate an academic environment that is open, creative, innovative, ethical, supportive, and dynamic.

2.2 Objectives

The objectives to achieve the mission of the Undergraduate Program in Statistics are as follows:

1. To produce competent graduates;
2. To provide a relevant and up-to-date curriculum;
3. To develop analytical and problem-solving skills;
4. To promote research and innovation;
5. To provide practical experience through internships, projects, and fieldwork;
6. To build strong communication and collaboration abilities;
7. To produce future leaders in the field of statistics;
8. To integrate ethical values into statistical practices;
9. To encourage community engagement and social responsibility;
10. To develop professional networks and partnerships.

2.3 Strategies

1. **Develop a Relevant Curriculum**: Involve a curriculum committee consisting of faculty members, industry professionals, student representatives, and alumni to design a curriculum aligned with labor market needs and recent advancements in statistics and data science.
2. **Enhance Teaching Quality**: Conduct regular training and development for lecturers in innovative teaching methodologies, and utilize educational technologies such as audio-visual tools and e-learning platforms to improve interactivity and learning outcomes.
3. **Provide Adequate Research Facilities**: Ensure the availability of research infrastructure, including computer laboratories, digital libraries, statistical and data science software, and necessary hardware to support student and faculty research.

4. **Improve Infrastructure and Resources**: Guarantee access to sufficient learning facilities, including up-to-date computer labs, statistical software, and artificial intelligence applications to support student learning and research.
5. **Facilitate Internships and Fieldwork**: Establish partnerships with industries, community organizations, government agencies, and research institutions to provide students with practical experience through internships and fieldwork in real-world settings.
6. **Encourage Student Research**: Foster a research culture among students by providing incentives, support, and adequate supervision from academic staff for student-led research initiatives.
7. **Develop Community Service Programs**: Promote student involvement in community service activities related to statistics, such as public training in statistical literacy or socially impactful research projects.
8. **Support Relevant Extracurricular Activities**: Organize seminars, workshops, and statistics competitions, and establish student clubs or study groups to help students deepen their statistical knowledge and skills beyond the classroom.
9. **Integrate Soft Skills Development**: Incorporate training in soft skills such as communication, leadership, and interdisciplinary collaboration into the curriculum, and offer opportunities to develop these skills through collaborative projects and extracurricular engagements.
10. **Provide Career Support Services**: Offer career guidance and professional development services to help students prepare for employment or pursue advanced academic studies after graduation.
11. **Build a Strong Alumni Network**: Develop and maintain a robust alumni network to provide mentorship, career opportunities, and support for both current students and graduates.
12. **Establish Advanced Study Programs**: Plan for the development of graduate-level programs such as master's and doctoral degrees in statistics and data science to provide a clear academic progression pathway for graduates.
13. **Implement Participatory and Continuous Evaluation**: Conduct continuous evaluation of the program's goals and achievements, and utilize feedback from students, faculty, and stakeholders to ensure ongoing improvement and relevance of the program.

2.4 University Value

The core values of Universitas Syiah Kuala (USK), referred to as "USK values," are derived from the foundational principles of Pancasila: sincerity, honesty, and togetherness, as stated in Article 7 of Government Regulation No. 38 of 2022.

CHAPTER 3
GRADUATE PROFILE AND FORMULATION OF COMPETENCY STANDARDS

3.1 Graduate Profile Description

In general, the graduate profiles of the Statistics Study Program can be grouped into three areas of expertise: academician, practitioner, and stat-technopreneur, based on input from discussions held within the Indonesian Forum for Higher Education in Statistics (FORSTAT). Additionally, the determination of graduate profiles is based on studies from surveys conducted by the Career Development Centre (CDC) of Universitas Syiah Kuala (USK), tracer studies of alumni, feedback from graduate users, partners, professional associations, or similar scientific organizations, and the results of Focus Group Discussions (FGD) involving multi-stakeholders. The outcomes of these studies serve as the foundation for conducting a SWOT analysis to map out the graduate profiles and determine the CP-PS, as shown in Table 3.1 below.

Table 3.1 Graduate Profile Description

Code	Graduate Profile	Competency	Profession
PL-01	Graduates possess the ability to solve simple and practical problems using statistical methods by applying appropriate statistical software. These skills can then be implemented by graduates in their roles as academics, practitioners, and stat-technopreneurs in the fields of Official Statistics, Biostatistics, Computational Statistics, Business, and Industry.	KK + P	Profession 1: Academics, researchers, developers, and educators. Profession 2: Practitioners, data analysts, policy analysts, consultants in specialized fields, data scientists, pollsters, survey designers/analysts, experimental designers, and statistical simulation designers. Profession 3: Entrepreneurs in various fields of statistics and data science.
PL-02	Graduates demonstrate a responsible attitude and a strong commitment to applying managerial and communication skills effectively within a team, upholding professional ethics and noble character.	KU + S	
PL-03	Graduates possess the ability to become creative socio-technopreneurs, with readiness to pursue self-development in Statistics and Data Science, as well as in other relevant fields, including those aligned with their professional careers.	MIPA Vision +USK + KU	

3.2 Elements of Intended Learning Outcomes (ILO)

In response to the need for enhancing the quality of education and aligning graduate competencies with labor market demands, the formulation of Intended Learning Outcomes (ILO) becomes critically important. In this context, the Indonesian National Qualifications Framework (KKNI) serves as the primary guideline to define the expected level of achievement for each graduate. The initial step in formulating ILO involves benchmarking against the learning outcomes of similar study programs, both nationally and internationally. This aims to provide a comprehensive understanding of the desired competency standards and best practices in relevant industries.

Additionally, engagement in the Statistics Forum or meetings with relevant stakeholders offers broader and deeper insights into labor market demands and industry developments. Inputs from alumni and graduate users are especially valuable in ensuring the relevance and appropriateness of the ILO with actual needs. The implementation of ILO involves a series of activities, including internal meetings with lecturers and academic staff to discuss and evaluate the progress of ILO implementation. In this way, the process of developing and implementing ILO ensures the maintenance of educational quality and prepares graduates to be competent and competitive in the global job market.

Table 3.2 outlines the eight Intended Learning Outcomes (ILO) for the Undergraduate Study Program in Statistics, which are aligned with the three Graduate Profiles (GP) described in Table 3.1. GP-01, which represents specific skills and knowledge, is associated with four ILOs (ILO-01 to ILO-04); GP-02, which reflects general skills and attitudes, is associated with two ILOs (ILO-05 and ILO-06); and GP-03, which reflects the vision of FMIPA and USK as well as general skills, is associated with two ILOs (ILO-07 and ILO-08).

Table 3.2 Relationship Between Graduates Profile (GP) and Intended Learning Outcomes (ILOs)

Code	ILO Code	ILO Descriptions
PL-01	CPL-01	Able to understand the basic concepts of calculus, matrices, probability, programming algorithms, and can explain the basic principle of statistics.
	CPL-02	Have the ability to use data collection techniques, statistical analysis methods, and data science, and be able to master statistical software in various applied fields.
	CPL-03	Skilled in solving real problems simply and practically, able to analyze and interpret data processing results. Ability to use data collection techniques, statistical analysis, and data science and master statistical software in various applied fields.
	CPL-04	Able to work and be responsible for the results of independent and group work at local, regional, and global levels.

PL-02	CPL-05	Be devoted to God Almighty, have noble character, demonstrate character that is in line with the principles of Pancasila, comply with professional ethics, and be responsible in contributing to society.
	CPL-06	Able to think logically, critically, systematically, and innovatively independently in applying, evaluating, and developing science and technology.
PL-03	CPL-07	Able to demonstrate creative aspects in entrepreneurship by combining and utilizing knowledge from various relevant scientific fields.
	CPL-08	Able to establish and maintain cooperation networks at regional and global levels, and skilled in operating information and communication technology.

3.3 Study Material Structuring

In accommodating the Intended Learning Outcomes (ILO), the structuring of Study Material (BK) represents the core of scientific knowledge in the Statistics study program. This content may include a body of knowledge that has been integrated into new understandings agreed upon by the Indonesian Forum for Higher Education in Statistics (FORSTAT). FORSTAT serves as the main platform for reaching consensus on the SC to be adopted. In the process of determining the study material, the Statistics Study Program involves various academic fields/laboratories available within the department. The study material is then further elaborated into teaching materials. The list of determined Study Material (BK) is presented in Table 3.3.

Table 3.3 Relationship between ILO and Study Material

ILO Code	Code	Study Material
CPL-01	BK-1	Calculus, Matrix Algebra, and Fundamentals of Statistics
CPL-02	BK-2	Design of Data Collection and Data Analysis
CPL-03	BK-3	Statistical Computing and Data Exploration
CPL-04	BK-4	Scientific Implementation and Application
CPL-05	BK-5	Character Education
CPL-06	BK-6	Environmental Science and Scientific Communication
CPL-07	BK-7	Business Management and Entrepreneurship
CPL-08	BK-8	Local Wisdom

3.4 Formulation of Course Learning Outcomes (CLO)

Course Learning Outcomes (CLO) are formulated based on the Intended Learning Outcomes (ILO) as outlined in Table 3.2. Each CLO corresponds to several courses with similar outcomes and is therefore more specific. It includes selected competencies and learning content, with clearly defined levels of depth and breadth

in accordance with the ILO assigned to the respective course. The Undergraduate Study Program in Statistics has defined 12 CLOs, as presented in Table 3.4.

Table 3.4 Course Learning Outcomes (CLO)

Code	CLO
CPMK-1	Students are able to understand the basic concepts of mathematics in learning statistics (CPL-01)
CPMK-2	Students are able to explain concepts, theoretical foundations, and discourses underlying the use of data and statistics (CPL-01)
CPMK-3	Students are able to design, generate, and utilize comprehensive data collection techniques (CPL-02)
CPMK-4	Students are able to apply descriptive and inferential statistical analysis to various types of data (CPL-02, CPL-03)
CPMK-5	Students are able to formulate model estimations and conduct hypothesis testing correctly and appropriately according to statistical principles (CPL-02)
CPMK-6	Students are able to use both open-source and licensed software such as MS Excel, Tableau, Minitab, SPSS, E-Views, Stata, R, and Python for data processing and analysis (CPL-03)
CPMK-7	Students are able to analyze data from real-world problems using appropriate statistical methods and communicate the results effectively (CPL-03, CPL-04)
CPMK-8	Students are able to apply and analyze data in internship or industrial work placement and research internships (CPL-03, CPL-04, CPL-08)
CPMK-9	Students are able to apply statistical methods in entrepreneurial internships, independent study programs, and community development projects (CPL-03, CPL-04, CPL-07, CPL-08)
CPMK-10	Students possess an entrepreneurial spirit and socio-technopreneur character (CPL-05, CPL-07)
CPMK-11	Students possess creative and innovative ideas and are capable of producing products (goods/services) (CPL-06, CPL-07)
CPMK-12	Students are able to seize market opportunities and engage in sustainable entrepreneurship (CPL-07, CPL-08)

3.5 Course Structuring

Courses are structured simultaneously by selecting and organizing subject matters derived from several elements of the formulated Intended Learning Outcomes (ILO). These subject matters are then elaborated into learning content within selected courses. The estimation of student workload is determined based on the credit point (SKS), assignments, and examinations for each course. In accordance with the Indonesian Ministry of Education and Culture Regulation No. 53 of 2023, one credit point (1 SKS) is equivalent to 45 hours per semester. Therefore, as an example, the total time required to complete a course is as follows:

Classroom Lecture : 100 minutes x 14 learning contents = 1400 minutes
Assignment : 4 assignment x 100 minutes/assignment = 400 minutes

Independent Learning : 14 learning contents x 50 minutes= 700 minutes
Examination : 2 exams x 100 minutes = 200 minutes
Total time required : 2700 minutes = 45 hours
Thus, the appropriate credit point (SKS) for the course is 1 credit.

The example of credit allocation for Undergraduate Study Program in Statistics courses can be seen in the following table.

**Example of Course Credit Allocation*

Code	Course Name	Total CLO	Estimated Student Workload Time		Credit Points
			Theory	Practicum	
SSTK1108	Data Exploration and Visualization	2	2,8125 hour/week for 16 weeks = 45 hours	2,8125 hour/week for 16 weeks = 45 hours	2
SSTK1004	Matrix Algebra	1	8,4375 hour/week for 16 week = 135 hours	0	3
SSTK1002	Calculus	1	11,25 hour/week for 16 week = 180 hours	0	4

**The weight of SKS per course is calculated as follows; weight of Credit Points (Total Estimated Time) x 1 Credit Points / (2.83 Hour/Week x 16 Weeks) = 45,28 Hours, then 134,4 Hours /45,28 hours = 2,97 which rounded up to 3 Credit Points*

Before conducting the assessment, it is necessary to first map the relationship between the Course Learning Outcomes (CLO) and the courses. The description of courses based on each CLO is presented in Table 3.5.

Table 3.5. Relationship between Course Learning Outcomes (CLO) and Courses

Code	CLO	Course Code	Course Name
CPMK-01	Students are able to understand the basic concepts of mathematics in learning statistics.	SSTK1002; SSTK1003; SSTK1004; SSTK2005; SSTK2009 SSTK6049 SSTK6072	Calculus; Scientific Paradigm and Communication; Matrix Algebra; Statistical Theory I; Numerical Methods; Linier Model Operations Research I
CPMK-02	Students are able to explain concepts, theoretical foundations, and discourses	SSTK1006; SSTK2005; SSTK2007; SSTK2016; SSTK2020; SSTK2022;	Introduction to Econometrics Statistical Theory I Nonparametric Statistics Statistical Theory II Introduction to Statistics Survey Design

Code	CLO	Course Code	Course Name
	underlying the use of data and statistics.	SSTK2023; SSTK2024; SSTK6040; SSTK6046; SSTK6050; SSTK6052; SSTK6075; SSTK6079; SSTK6107;	Databases & Data Search – SQL Survey Design Practicum Fuzzy Systems Introduction to Actuarial Science Advanced Calculus Data Structures Advanced Time Series Analysis Meta-Analysis Survival Analysis
CPMK-03	Students are able to design, generate, and use data collection techniques.	SSTK1001; SSTK2015; SSTK2017; SSTK2022; SSTK2024; SSTK2026; SSTK2028; SSTK3029; SSTK3031; SSTK3034; SSTK6049; SSTK6051; SSTK6053; SSTK6057; SSTK6065; SSTK6080; SSTK6093; SSTK6097; SSTK6098; SSTK6113;	Statistical Methods Practicum; Sampling Techniques; Sampling Techniques Practicum; Survey Design; Survey Design Practicum; Experimental Design I; Experimental Design I Practicum; Data Mining; Data Mining Practicum; Statistical Computing and Simulation; Linear Models; Experimental Design II; Experimental Design II Practicum; Disaster Statistics Practicum; Econometrics II Practicum; Item Response Theory; Text Analysis Practicum Practicum; Artificial Intelligence Practicum; Advanced Nonparametric Statistics; Stochastic Processes Practicum
CPMK-04	Students are able to apply descriptive and inferential statistical analysis to various types of data.	SSTK1001; SSTK1008; SSTK1010; SSTK1012; SSTK1014; SSTK2018; SSTK2019; SSTK2021; SSTK2030; SSTK2032; SSTK6041; SSTK6043; SSTK6044; SSTK6054; SSTK6066; SSTK6070; SSTK6076; SSTK6075; SSTK6077; SSTK6080; SSTK6087;	Statistical Methods Practicum Data Exploration and Visualization Data Exploration and Visualization Practicum Algorithms and Programming Algorithms and Programming Practicum Categorical Data Analysis Introduction to Data Science Introduction to Data Science Practicum Multivariate Analysis Multivariate Analysis Practicum Environmental Health Statistics Educational Measurement and Evaluation Population Statistics Data Structures Practicum Management Information Systems Practicum Econometrics I Practicum Longitudinal Data Analysis Advanced Time Series Analysis Advanced Time Series Analysis Practicum Item Response Theory Business Intelligence and Data Analytics

Code	CLO	Course Code	Course Name
		SSTK6089; SSTK6092; SSTK6096; SSTK6099; SSTK6101; SSTK6104; SSTK6108; SSTK6111;	Business Intelligence and Data Analytics Practicum Biostatistical Computing Practicum Advanced Numerical Methods Practicum Structural Equation Modeling Structural Equation Modeling Practicum Statistical Quality Control II Practicum Marketing Research Practicum Stochastic Processes
CPMK-05	Students are able to formulate model estimation and conduct hypothesis testing correctly and appropriately according to statistical principles.	SSTK2007; SSTK2011; SSTK2013; SSTK2018; SSTK2019; SSTK2021; SSTK3025; SSTK2026; SSTK2030; SSTK2032; SSTK3036; SSTK6051; SSTK6052; SSTK6103; SSTK6105; SSTK6115;	Nonparametric Statistics Regression Analysis Regression Analysis Practicum Categorical Data Analysis Introduction to Data Science Introduction to Data Science Practicum Time Series Analysis Experimental Design I Multivariate Analysis Multivariate Analysis Practicum Capita Selecta Experimental Design II Data Structures Statistical Modeling Statistical Modeling Practicum Advanced Capita Selecta
CPMK-06	Students are able to use both open-source and licensed software such as MS Excel, Tableau, Minitab, SPSS, E-Views, Stata, R, and Python for data processing and analysis.	SSTK1010; SSTK1012; SSTK1014; SSTK2011; SSTK2013; SSTK2015; SSTK2017; SSTK2023; SSTK2025; SSTK2028; SSTK3021; SSTK3023; SSTK3027; SSTK3029; SSTK3031; SSTK3034; SSTK6040; SSTK6049; SSTK6052; SSTK6053; SSTK6054; SSTK6056; SSTK6057; SSTK6058; SSTK6059;	Exploratory Data Analysis and Visualization Practicum Algorithms and Programming Algorithms and Programming Practicum Regression Analysis Regression Analysis Practicum Sampling Techniques Sampling Techniques Practicum Database and Data Search – SQL Database and Data Search – SQL Practicum Experimental Design I Practicum Statistical Quality Control I Statistical Quality Control I Practicum Time Series Analysis Practicum Data Mining Data Mining Practicum Statistical Computing and Simulation Fuzzy Systems Linear Models Data Structures Experimental Design II Practicum Data Structures Practicum Machine Learning Disaster Statistics Practicum Machine Learning Practicum Spatial Statistics

Code	CLO	Course Code	Course Name
		SSTK6060; SSTK6061; SSTK6062; SSTK6064; SSTK6065; SSTK6067; SSTK6069; SSTK6081; SSTK6083; SSTK6085; SSTK6087; SSTK6090; SSTK6093; SSTK6094 SSTK6097; SSTK6098; SSTK6105; SSTK6109; SSTK6111; SSTK6113;	Geographic Information Systems Spatial Statistics Practicum Geographic Information Systems Practicum Management Information Systems Econometrics II Practicum Operations Research II Operations Research II Practicum Meta-Analysis Practicum Big Data Programming Big Data Programming Practicum Business Intelligence and Data Analytics Computational Biostatistics Text Analysis Practicum Advanced Numerical Methods Artificial Intelligence Practicum Advanced Nonparametric Statistics Statistical Modeling Practicum Survival Analysis Practicum Stochastic Processes Stochastic Processes Practicum
CPMK-07	Students are able to perform data analysis on real-world problems using appropriate statistical methods and communicate the results effectively.	SSTK1006; SSTK2020; SSTK3021; SSTK3023; SSTK3025; SSTK3038; SSTK6039; SSTK6041; SSTK6042; SSTK6043; SSTK6044; SSTK6046; SSTK6048; SSTK6055; SSTK6056; SSTK6058; SSTK6059; SSTK6060; SSTK6061; SSTK6062; SSTK6063; SSTK6065; SSTK6067; SSTK6068; SSTK6069; SSTK6071; SSTK6072; SSTK6078; SSTK6082; SSTK6083;	Introduction to Econometrics Introduction to Biostatistics Statistical Quality Control I Statistical Quality Control I Practicum Time Series Analysis Colloquium Epidemiology Environmental Health Statistics Official Statistics Educational Measurement and Evaluation Population Statistics Introduction to Actuarial Science Business and Operations Management Disaster Statistics Machine Learning Machine Learning Practicum Spatial Statistics Geographic Information Systems Spatial Statistics Practicum Geographic Information Systems Practicum Econometrics II Econometrics II Practicum Operations Research II Econometrics I Operations Research II Practicum Health Data Analysis Operations Research I Environmental Statistics Sociometrics Big Data Programming

Code	CLO	Course Code	Course Name
		SSTK6084; SSTK6091; SSTK6095; SSTK6107;	Public Policy Analysis Text Analysis Artificial Intelligence Survival Analysis
CPMK-08	Students are able to apply and analyze data in internship or industrial work placement, and research internships.	SSTK6047; SSTK6095; SSTK6106;	Financial Analysis Artificial Intelligence Marketing Research
CPMK-09	Students are able to apply statistical methods in entrepreneurial internships, independent study, and community development projects.	SSTK6042; SSTK6047; SSTK6088; SSTK6073;	Official Statistics Financial Analysis Forensic Statistics Actuarial Science
CPMK-10	Students possess an entrepreneurial spirit and socio-technopreneuri al character.	SSTK6084; SSTK6088; SSTK6073;	Statistical Business and Profession Forensic Statistics Actuarial Science
CPMK-11	Students possess creative and innovative ideas and are capable of producing products (goods/services).	SSTK3036; SSTK6047; SSTK6048; SSTK6094; SSTK6106; SSTK6110; SSTK6112; SSTK6115;	Capita Selecta Financial Analysis Operations and Business Management Advanced Numerical Methods Marketing Research Digital Business Digital Business Practicum Advanced Selected Topics
CPMK-12	Students are able to seize market opportunities and engage in sustainable entrepreneurship.	SSTK6110; SSTK6112;	Digital Business Digital Business Practicum

Next, the ILO must be evaluated based on student learning outcomes, which are then linked to the CLO. To facilitate assessment, the curriculum has been mapped in advance to show the relationship between the ILOs and the courses.

Table 3.6 Matrix relationship between Courses and ILO

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
MKWU1002	Civic Education					√			
MKWU1005	Disaster and Environment	√							
SMPA1001	Introduction to Calculus	√							
SMPA1011	Statistical Methods		√	√					
SSTK1001	Statistical Methods Practicum		√						
SSTK1003	Scientific Paradigm and Communication	√							
MKWU1001	Pancasila					√			
MKWU1003	Indonesian Language					√			
MKWU1004	English					√			
SSTK1008	Data Exploration and Visualization		√	√					
SSTK1010	Data Exploration and Visualization Practicum		√	√					
SSTK1012	Algorithms and Programming		√	√					
SSTK1014	Algorithms and Programming Practicum		√	√					
SSTK1004	Matrix Algebra	√							
SSTK1006	Introduction to Econometrics	√		√	√				
SSTK1002	Calculus	√							
MKWU2001	Religion Education					√			

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
SSTK2005	Statistical Theory I	√							
SSTK2011	Regression Analysis		√	√					
SSTK2013	Regression Analysis Practicum		√	√					
SSTK2019	Introduction to Data Science		√	√					
SSTK2021	Introduction to Data Science Practicum		√	√					
SSTK2015	Sampling Techniques		√	√					
SSTK2017	Sampling Techniques Practicum		√	√					
SSTK2023	Database and Data Search – SQL	√		√					
SSTK2025	Database and Data Search – SQL Practicum			√					
SSTK2009	Numerical Methods	√							
SSTK2007	Nonparametric Statistics	√	√						
SSTK2016	Statistical Theory II	√							
SSTK2026	Experimental Design I		√						
SSTK2028	Experimental Design I Practicum		√	√					
SSTK2030	Multivariate Statistical Analysis		√	√					

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
SSTK2032	Multivariate Statistical Analysis Practicum		√						
SSTK2018	Categorical Data Analysis		√	√					
SSTK2022	Survey Design	√	√						
SSTK2024	Survey Design Practicum	√	√						
SSTK2020	Introduction to Biostatistics	√		√	√				
SSTK3017	Research Methodology		√	√	√				√
SSTK3021	Statistical Quality Control I			√	√				
SSTK3023	Statistical Quality Control I Practicum			√					
SSTK3029	Data Mining		√	√					
SSTK3031	Data Mining Practicum		√	√					
SSTK3025	Time Series Analysis		√	√	√				
SSTK3027	Time Series Analysis Practicum			√					
SSTK3019	Introduction to Digital Business			√				√	√
SSTK3036	Capita Selecta		√				√	√	
SSTK3038	Colloquium			√	√				
SSTK3034	Statistical Computation and Simulation		√	√					
SMPAP001	Internship				√				√
MKWUP001	Community					√			√

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
	Service								
SMPAP002	Research Proposal				√		√		
SMPAPA01	Final Project			√	√				
SSTK6040	Fuzzy Systems	√		√					
SSTK6042	Official Statistics			√					
SSTK6044	Population Statistics		√	√	√				
SSTK6046	Introduction to Actuarial Science	√		√	√				
SSTK6048	Operations and Business Management			√			√		
SSTK6050	Advanced Calculus	√							
SSTK6052	Data Structures	√	√	√					
SSTK6054	Data Structures Practicum		√	√					
SSTK6056	Machine Learning			√					
SSTK6058	Machine Learning Practicum			√					
SSTK6060	Geographic Information System			√					
SSTK6062	Geographic Information System Practicum			√					
SSTK6064	Management Information System			√					
SSTK6066	Management Information		√	√					

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
	System Practicum								
SSTK6068	Econometrics I			√	√				
SSTK6070	Econometrics I Practicum		√	√					
SSTK6072	Operations Research I	√		√					
SSTK6074	Operations Research I Practicum		√	√					
SSTK6033	Introduction to Physics Practicum	√							
SSTK6035	Introduction to Chemistry Practicum	√							
SSTK6037	Introduction to Biology Practicum	√							
SSTK6039	Epidemiology			√	√				
SSTK6041	Environmental Health Statistics			√	√				
SSTK6043	Educational Measurement and Evaluation		√	√					
SSTK6045	Introduction to Financial Analysis		√	√					
SSTK6047	Financial Analysis			√	√		√	√	√
SSTK6049	Linear Models	√	√	√					
SSTK6051	Experimental Design II		√						
SSTK6053	Experimental Design II Practicum		√	√					

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
SSTK6055	Disaster Statistics			√	√				
SSTK6057	Disaster Statistics Practicum		√	√					
SSTK6059	Spatial Statistics			√	√				
SSTK6061	Spatial Statistics Practicum			√	√				
SSTK6063	Econometrics II			√	√				
SSTK6065	Econometrics II Practicum		√	√					
SSTK6067	Operations Research II			√	√				
SSTK6069	Operations Research II Practicum			√	√				
SSTK6076	Longitudinal Data Analysis		√	√					
SSTK6078	Environmental Statistics			√	√				
SSTK6080	Item Response Theory		√	√					
SSTK6082	Sociometrics			√	√				
SSTK6084	Public Policy Analysis			√	√				
SSTK6086	Statistical Business and Profession					√		√	
SSTK6088	Forensic Statistics			√	√	√		√	√
SSTK6090	Computational Biostatistics			√					
SSTK6092	Computational Biostatistics Practicum		√	√					

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
SSTK6094	Advanced Numerical Methods			√			√		
SSTK6096	Advanced Numerical Methods Practicum		√	√					
SSTK6098	Advanced Nonparametric Statistics		√	√					
SSTK6100	Advanced Nonparametric Statistics Practicum		√	√					
SSTK6102	Statistical Quality Control II			√	√				√
SSTK6104	Statistical Quality Control II Practicum		√	√					
SSTK6108	Marketing Research			√	√		√	√	√
SSTK6108	Marketing Research Practicum		√	√					
SSTK6110	Digital Business						√	√	
SSTK6112	Digital Business Practicum						√	√	
SSTK6071	Health Data Analysis			√	√				
SSTK6073	Actuarial Science			√	√	√		√	√
SSTK6075	Advanced Time Series Analysis	√	√	√					
SSTK6077	Advanced Time Series Analysis Practicum		√	√					

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
SSTK6079	Meta Analysis	√							
SSTK6081	Meta Analysis Practicum			√					
SSTK6083	Big Data Programming			√	√				
SSTK6085	Big Data Programming Practicum			√					
SSTK6087	Business Intelligence and Data Analytics			√					
SSTK6089	Business Intelligence and Data Analytics Practicum			√					
SSTK6091	Text Analysis			√	√				
SSTK6093	Text Analysis Practicum		√	√					
SSTK6095	Artificial Intelligence			√	√				√
SSTK6097	Artificial Intelligence Practicum		√	√					
SSTK6099	Structural Equation Modeling		√	√					
SSTK6101	Structural Equation Modeling Practicum		√	√					
SSTK6103	Statistical Modeling		√						
SSTK6105	Statistical Modeling Practicum		√	√					
SSTK6107	Survival Analysis	√		√	√				

Code	Course Name	ILO Code							
		CPL1	CPL2	CPL3	CPL4	CPL5	CPL6	CPL7	CPL8
SSTK6109	Survival Analysis Practicum			√					
SSTK6111	Stochastic Processes			√					
SSTK6113	Stochastic Processes Practicum		√	√					
SMPA6001	Entrepreneurial Practice							√	
SMPA6002	Scientific Publication		√	√			√		
SMPA6003	Industrial Internship A						√	√	√
SMPA6004	Industrial Internship B						√	√	√
SMPA6005	Village Project A						√		
SMPA6006	Village Project B						√		
SMPA6007	Science Teaching Practice A						√	√	√
SMPA6008	Science Teaching Practice A						√	√	√

Afterward, the courses that support each Intended Learning Outcome (ILO) are determined, with the expectation that students will be able to understand fundamental concepts, apply these concepts, and ultimately solve encountered problems. The learning components listed in Table 3.3 need to be described further to clarify the scope of learning for each component, as presented in Table 3.7.

Table 3.7. Study Material Description

Code	Study Material (Course Name)	Description
SMPA1001; SMPA1011; SSTK1004; SSTK1002; SSTK2005;	BK-1 (Introduction to Calculus, Statistical Methods, Matrix Algebra, Calculus, Statistical Theory I,	The courses Calculus, Matrix Algebra, and Fundamentals of Statistics are provided to build understanding in analyzing various mathematical phenomena and empirical realities. Calculus lays the foundation for

Code	Study Material (Course Name)	Description
SSTK2016; SSTK2009	Statistical Theory II, Numerical Methods)	understanding change and rates of change, which are essential in analyzing trends and patterns in statistical data and in decision-making processes. Concepts such as derivatives and integrals in Calculus enable us to model and measure phenomena that vary over time or with other variables. These courses offer a solid mathematical foundation for modeling, analyzing, and interpreting data across various scientific disciplines.
SSTK2011; SSTK2015; SSTK2023; SSTK2007; SSTK2026; SSTK2030; SSTK2018; SSTK2022; SSTK2020; SMPA3013 SSTK3017; SSTK3021; SSTK3025; SSTK6043	BK-2 (Regression Analysis, Sampling Techniques, Database and Data Search–SQL, Nonparametric Statistics, Experimental Design I, Multivariate Analysis, Categorical Data Analysis, Survey Design, Introduction to Biostatistics, Entrepreneurship, Research Methodology, Statistical Quality Control I, Time Series Analysis, Educational Measurement and Evaluation.)	In these courses, students will learn about various data collection methods, sample selection, determining appropriate sample sizes, proper experimental design, survey design concepts, experimental design concepts, statistical simulation design, and observation. In addition, students will study a range of data analysis techniques, from basic descriptive methods to more complex inferential methods. This includes a fundamental understanding of descriptive statistics, probability distributions, hypothesis testing, regression analysis, and analysis of variance. Students will also learn to use statistical software to efficiently perform data analysis.
SSTK2019; SSTK1012; SSTK3034; SSTK1008; SSTK3029; SSTK6040; SSTK6052; SSTK6056; SSTK6083; SSTK6091; SSTK6095	BK-3 (Introduction to Data Science, Algorithms and Programming, Statistical Computing and Simulation, Data Exploration and Visualization, Data Mining, Fuzzy Systems, Data Structures, Machine Learning, Big Data Programming, Text Analysis, Artificial Intelligence)	The courses of "Statistical Computing and Data Exploration" combine statistical concepts with modern computational techniques to analyze and explore data effectively. This course emphasizes the use of statistical software and programming languages to process, analyze, and visualize data. In addition, students will learn data exploration techniques, including a basic understanding of data distributions, data visualization using graphs and plots, and exploration of patterns and relationships in data through descriptive statistical methods. They will also study more advanced statistical analysis techniques, such as the use of predictive models and machine learning algorithms to identify hidden patterns in the data.
SSTK6044; SSTK6072; SSTK6068;	BK-4 (Population Statistics, Operations Research I,	The courses of "Statistical Knowledge Implementation" aim to equip students with a deep understanding of how

Code	Study Material (Course Name)	Description
SSTK6046; SSTK6048; SSTK6042; SSTK6041; SSTK6063; SSTK6045; SSTK6059; SSTK6039; SSTK6086; SSTK6090; SSTK6071; SSTK6107	Econometrics I, Introduction to Actuarial Science, Operations and Business Management, Official Statistics, Environmental Health Statistics, Econometrics II, Introduction to Financial Analysis, Spatial Statistics, Epidemiology, Statistical Business and Profession, Computational Biostatistics, Health Data Analysis, Survival Analysis)	statistical concepts are applied in real-world contexts. The main focus of this course is the practical application of statistical theories and methods across various fields, including computing, health, business and industry, and official statistics. In these courses, students will learn how to apply a variety of statistical techniques to analyze real data, evaluate hypotheses, and make decisions supported by statistical evidence. They will be introduced to case studies from various disciplines and will be guided to understand how statistics is used to address real-world problems in research, industry, government, and other sectors.
MKWU1006; MKWU1007; MKWU1002; MKWU1001; MKWU2001	BK-5 (Character Building 1, Character Building 2 Civic Education, Pancasila, Religion Education)	The Character Education courses cover the concepts, theories, and practices related to the development of individual character or morals, aiming to provide a comprehensive understanding of the values, attitudes, and behaviors that form the foundation of good character. Through this course, students are encouraged to explore various theories and practices that support character development, both in educational settings and in everyday life.
SSTK1003; SMPA1009; MKWU1003; SSTK3017	BK-6 (Scientific Paradigm and Communication, Introduction to Industrial Revolution, Indonesian Language, Research Methodology)	The Environmental Science and Scientific Communication courses provide an in-depth understanding of various aspects of environmental science along with skills in effective scientific communication. The environmental science component covers basic concepts of ecology, environmental pollution, climate change, natural resource conservation, environmental policy, waste management, sustainable agriculture, and environmental health. Meanwhile, the scientific communication component addresses research ethics, the use of accurate information sources, and the application of scientific communication in various contexts.
SMPA3013; SSTK1006; SSTK6067;	BK-7 (Entrepreneurship	The Business Management courses provide a comprehensive understanding of various aspects of organizational and

Code	Study Material (Course Name)	Description
SSTK6048; SSTK6045; SSTK6106; SSTK6110	Introduction to Econometrics Operations Research II Operations and Business Management Introduction to Financial Analysis Marketing Research Digital Business Actuarial Science)	operational management, covering fundamental management concepts such as planning, organizing, directing, and controlling. Additionally, the Entrepreneurship course focuses on the foundational concepts of entrepreneurship and the process of starting and managing a new venture. It includes topics such as identifying business opportunities, business planning, financing, marketing, and risk management.
SSTK6073; MKWU1006; MKWU1007; SSTK6055; SSTK6071	BK-8 (Character Building 1 Character Building 2 Disaster Statistics Health Data Analysis)	The Local Wisdom courses offer an in-depth understanding of local wisdom as an essential part of a community's cultural heritage. This course focuses on the study of values, beliefs, traditions, and local practices that have developed within specific cultural, environmental, and historical contexts.

3.6 Curriculum Structure

The curriculum structure of the Undergraduate Program in Statistics is organized in the form of a matrix of courses per semester.

Table 3.8. List of Compulsory Courses

No	Code	Course	Credit Point	(T-P)	Category	Requirement
		Semester 1				
1	MKWU1002	Civic Education	2	(2 - 0)	W	-
2	MKWU1005	Disaster and Environmental Management	2	(2 - 0)	W	-
3	MKWU1006	Character Building I	0	(0 - 0)	W	-
4	SMPA1001	Introduction to Calculus	3	(3 - 0)	W	-
5	SMPA1003	Introduction to Physics	2	(2 - 0)	W	-
6	SMPA1005	Introduction to Chemistry	2	(2 - 0)	W	-
7	SMPA1007	Introduction to Biology	2	(2 - 0)	W	-
8	SMPA1009	Introduction to Industrial Revolution	2	(2 - 0)	W	-
9	SMPA1011	Statistical Methods	2	(2 - 0)	W	-
10	SSTK1001	Statistical Methods Practicum	1	(0 - 1)	W	-
11	SSTK1003	Scientific Paradigm and Communication	2	(2 - 0)	W	-
		Semester 2				

No	Code	Course	Credit Point	(T-P)	Category	Requirement
1	MKWU1001	Pancasila	2	(2 - 0)	W	-
2	MKWU1003	Indonesian Language	2	(2 - 0)	W	-
3	MKWU1004	English	2	(2 - 0)	W	-
4	MKWU1007	Character Building II	0	(0 - 0)	W	-
5	SSTK1002	Calculus	4	(4 - 0)	W	-
6	SSTK1004	Matrix Algebra	3	(3 - 0)	W	-
7	SSTK1006	Introduction to Econometrics	2	(2 - 0)	W	-
8	SSTK1008	Data Exploration and Visualization	1	(1 - 0)	W	-
9	SSTK1010	Data Exploration and Visualization Practicum	1	(0 - 1)	W	-
10	SSTK1012	Algorithms and Programming	2	(2 - 0)	W	-
11	SSTK1014	Algorithms and Programming Practicum	1	(0 - 1)	W	-
		Semester 3				
1	MKWU2001	Religion Education	2	(2 - 0)	W	MKWU1006 MKWU1007
2	SSTK2005	Statistical Theory I	3	(3 - 0)	W	SSTK1002
3	SSTK2007	Nonparametric Statistics	2	(2 - 0)	W	SMPA1011
4	SSTK2009	Numerical Methods	2	(2 - 0)	W	SSTK1002
5	SSTK2011	Regression Analysis	2	(2 - 0)	W	SMPA1011
6	SSTK2013	Regression Analysis Practicum	1	(0 - 1)	W	-
7	SSTK2015	Sampling Technique	2	(2 - 0)	W	SMPA1011
8	SSTK2017	Sampling Technique Practicum	1	(0 - 1)	W	-
9	SSTK2019	Introduction to Data Science	2	(2 - 0)	W	-
10	SSTK2021	Introduction to Data Science Practicum	1	(0 - 1)	W	-
11	SSTK2023	Database and Data Search – SQL	2	(2 - 0)	W	SSTK1012
12	SSTK2025	Database and Data Search – SQL Practicum	1	(0 - 1)	W	-
		Semester 4				
1	SSTK2016	Statistical Theory II	3	(3 - 0)	W	SSTK2005
2	SSTK2018	Categorical Data Analysis	3	(3 - 0)	W	SSTK2011
3	SSTK2020	Introduction to Biostatistics	2	(2 - 0)	W	SMPA1011
4	SSTK2022	Survey Design	1	(1 - 0)	W	SSTK2015
5	SSTK2024	Survey Design	1	(0 - 1)	W	-
6	SSTK2026	Experimental Design I	2	(2 - 0)	W	SMPA1011
7	SSTK2028	Experimental Design I Practicum	1	(0 - 1)	W	-

No	Code	Course	Credit Point	(T-P)	Category	Requirement
8	SSTK2030	Multivariate Statistical Analysis	2	(2 - 0)	W	SSTK1004
9	SSTK2032	Multivariate Statistical Analysis Practicum	1	(0 - 1)	W	-
10		Elective Courses	5		P	
		Semester 5				
1	SMPA3013	Entrepreneurship	2	(2 - 0)	W	-
2	SMPA3015	Entrepreneurship Practicum	1	(0 - 1)	W	-
3	SSTK3017	Research Methodology	2	(2 - 0)	W	SSTK2015
4	SSTK3019	Introduction to Digital Business	2	(2 - 0)	W	-
5	SSTK3021	Statistical Quality Control I	2	(2 - 0)	W	SMPA1011
6	SSTK3023	Statistical Quality Control I Practicum	1	(0 - 1)	W	-
7	SSTK3025	Time Series Analysis	2	(2 - 0)	W	SSTK2011
8	SSTK3027	Time Series Analysis Practicum	1	(0 - 1)	W	-
9	SSTK3029	Data Mining	2	(2 - 0)	W	-
10	SSTK3031	Data Mining Practicum	1	(0 - 1)	W	-
11		Elective Courses	5		P	
		Semester 6				
1	SSTK3034	Statistical Computation and Simulation	3	(3 - 0)	W	SSTK2019
2	SSTK3036	Capita Selecta	2	(2 - 0)	W	-
3	SSTK3038	Colloquium	2	(2 - 0)	W	SSTK3017
4		Elective Courses	11		P	
		Semester 7				
1	MKWUP001	Community Service	2	(2 - 0)	W	*)
2	SMPAP001	Internship	2	(2 - 0)	W	≥ 80 SKS
3	SMPAP002	Research Proposal	3	(3 - 0)	W	**)
4		Elective Courses	12		P	
		Semester 8				
1	SMPAPA01	Final Project	4	(4 - 0)	W	***)

Requirement

*) Passed ≥ 100 credits or complied with the applicable provisions set by the Community Service Program (KKN) Executive Board of Universitas Syiah Kuala.

**) Passed ≥ 120 credits, has a GPA ≥ 2.0, has passed compulsory courses related to the research field with a minimum grade of BC, or complied with the provisions stated in the 2024 USK Academic Guide.

***) Has passed or is currently conducting the research proposal.

Table 3.9. List of Elective Courses

No	Kode	Mata Kuliah	Credit Point	(T-P)	Kategori	Prasyarat
		Semester 4				
1	SSTK6040	Fuzzy System	2	(2 - 0)	P	-
2	SSTK6042	Official Statistics	2	(2 - 0)	P	-
3	SSTK6044	Population Statistics	2	(2 - 0)	P	SMPA1011
4	SSTK6046	Introduction to Actuarial Science	3	(3 - 0)	P	-
5	SSTK6048	Operations and Business Management	3	(3 - 0)	P	-
6	SSTK6050	Advanced calculus	3	(3 - 0)	P	SSTK1002
7	SSTK6052	Data Structure	2	(3 - 0)	P	-
8	SSTK6054	Data Structure Practicum	1	(0 - 1)	P	-
9	SSTK6056	Machine Learning	3	(3 - 0)	P	-
10	SSTK6058	Machine Learning Practicum	1	(0 - 1)	P	-
11	SSTK6060	Geographic Information System	2	(2 - 0)	P	-
12	SSTK6062	Geographic Information System Practicum	1	(0 - 1)	P	-
13	SSTK6064	Management Information System	2	(2 - 0)	P	-
14	SSTK6066	Management Information System Practicum	1	(0 - 1)	P	-
17	SSTK6068	Ekonometrics I	2	(2 - 0)	P	SSTK1006
18	SSTK6070	Ekonometrics I Practicum	1	(0 - 1)	P	-
19	SSTK6072	Operations Research I	2	(2 - 0)	P	-
20	SSTK6074	Operations Research I Practicum	1	(0 - 1)	P	-
		Semester 5				
1	SSTK6033	Introduction to Physics Practicum	1	(0 - 1)	P	-
2	SSTK6035	Introduction to Chemistry Practicum	1	(0 - 1)	P	-
3	SSTK6037	Introduction to Biology Practicum	1	(0 - 1)	P	-
4	SSTK6039	Epidemiology	2	(2 - 0)	P	-

No	Kode	Mata Kuliah	Credit Point	(T-P)	Kategori	Prasyarat
5	SSTK6041	Environmental Health Statistics	2	(2 - 0)	P	
6	SSTK6043	Educational Measurement and Evaluation	2	(2 - 0)	P	-
7	SSTK6045	Introduction to Financial Analysis	3	(3 - 0)	P	-
8	SSTK6047	Financial Analysis	3	(3 - 0)	P	SSTK6045
9	SSTK6049	Linear Models	3	(3 - 0)	P	-
10	SSTK6051	Experimental Design II	2	(2 - 0)	P	SSTK2026
11	SSTK6053	Experimental Design II Practicum	1	(0 - 1)	P	-
12	SSTK6055	Disaster Statistics	2	(2 - 0)	P	-
13	SSTK6057	Disaster Statistics Practicum	1	(0 - 1)	P	-
14	SSTK6059	Spatial Statistics	2	(2 - 0)	P	-
15	SSTK6061	Spatial Statistics Practicum	1	(0 - 1)	P	-
16	SSTK6063	Econometrics II	2	(2 - 0)	P	SSTK6058
17	SSTK6065	Econometrics II Practicum	1	(0 - 1)	P	-
18	SSTK6067	Operations Research II	2	(2 - 0)	P	SSTK6062
19	SSTK6069	Operations Research II Practicum	1	(0 - 1)	P	-
		Semester 6				
1	SSTK6076	Longitudinal Data Analysis	2	(2 - 0)	P	-
2	SSTK6078	Environmental Statistics	2	(2 - 0)	P	-
3	SSTK6080	Item Response Theory	2	(2 - 0)	P	-
4	SSTK6082	Sociometrics	2	(2 - 0)	P	-
5	SSTK6084	Public Policy Analysis	2	(2 - 0)	P	-
6	SSTK6086	Statistical Business and Profession	2	(2 - 0)	P	-
7	SSTK6088	Forensic Statistics	3	(3 - 0)	P	-
8	SSTK6090	Computational Biostatistics	2	(2 - 0)	P	-
9	SSTK6092	Computational Biostatistics Practicum	1	(0 - 1)	P	-
10	SSTK6094	Advanced Numerical Methods	2	(2 - 0)	P	SSTK2009
11	SSTK6096	Advanced Numerical	1	(0 - 1)	P	-

No	Kode	Mata Kuliah	Credit Point	(T-P)	Kategori	Prasyarat
		Methods Practicum				
12	SSTK6098	Advanced Nonparametric Statistics	2	(2 - 0)	P	SSTK2007
13	SSTK6100	Advanced Nonparametric Statistics Practicum	1	(0 - 1)	P	-
14	SSTK6102	Statistical Quality Control II	2	(2 - 0)	P	SSTK3021
15	SSTK6104	Statistical Quality Control II Practicum	1	(0 - 1)	P	-
16	SSTK6106	Marketing Research	2	(2 - 0)	P	-
17	SSTK6108	Marketing Research Practicum	1	(0 - 1)	P	-
18	SSTK6110	Digital Business	2	(2 - 0)	P	-
19	SSTK6112	Digital Business Practicum	1	(0 - 1)	P	-
		Semester 7				
1	SSTK6071	Health Data Analysis	2	(2 - 0)	P	-
2	SSTK6073	Actuarial Science	2	(2 - 0)	P	-
3	SSTK6075	Advanced Time Series Analysis	2	(2 - 0)	P	SSTK3025
4	SSTK6077	Advanced Time Series Analysis Practicum	1	(0 - 1)	P	-
5	SSTK6079	Meta Analysis	2	(2 - 0)	P	-
6	SSTK6081	Meta Analysis Practicum	1	(0 - 1)	P	-
7	SSTK6083	Big Data Programming	2	(0 - 1)	P	-
8	SSTK6085	Big Data Programming Practicum	1	(2 - 0)	P	-
9	SSTK6087	Business Intelligence and Data Analytics	2	(2 - 0)	P	-
10	SSTK6089	Business Intelligence and Data Analytics Practicum	1	(0 - 1)	P	-
11	SSTK6091	Text Analysis	2	(2 - 0)	P	-
12	SSTK6093	Text Analysis Practicum	1	(0 - 1)	P	-
13	SSTK6095	Artificial Intelligence	2	(2 - 0)	P	-
14	SSTK6097	Artificial Intelligence Practicum	1	(0 - 1)	P	-
15	SSTK6099	Structural Equation	2	(1 - 0)	P	SSTK2011

No	Kode	Mata Kuliah	Credit Point	(T-P)	Kategori	Prasyarat
		Modeling				
16	SSTK6101	Structural Equation Modeling Practicum	1	(0 - 1)	P	-
17	SSTK6103	Statistical Modeling	2	(2 - 0)	P	SSTK1002
18	SSTK6105	Statistical Modeling Practicum	1	(0 - 1)	P	-
19	SSTK6107	Survival Analysis	2	(2 - 0)	P	SSTK2005
20	SSTK6109	Survival Analysis Practicum	1	(0 - 1)	P	-
21	SSTK6111	Stochastic Processes	2	(2 - 0)	P	SSTK2016
22	SSTK6113	Stochastic Processes Practicum	1	(0 - 1)	P	-
23	SSTK6115	Advanced Capita Selecta	2	(2 - 0)	P	-

List of Elective Courses under the MBKM Program

No	Code	Course	Credit Point	(T-P)	Category	Requirement
1	SMPAP003	Entrepreneurial Practice (sm.5)	18	(0 - 18)	P	-
2	SMPAP004	Scientific Publication (sm.6)	11	(0 - 11)	P	-
3	SMPAP005	Industrial Internship A (sm.5)	17	(0 - 17)	P	-
4	SMPAP006	Industrial Internship B (sm.6)	11	(0 - 11)	P	-
5	SMPAP007	Village Project A (sm.5)	18	(0 - 18)	P	-
6	SMPAP008	Village Project B (sm.6)	12	(0 - 12)	P	-
7	SMPAP009	Science Teaching Practice A (sm.7)	18	(0 - 18)	P	-
8	SMPAP010	Science Teaching Practice B (sm.6)	12	(0 - 12)	P	-

3.7 Overview

Table 3.10. General Information on Study Material

General Information	Total Credit Point
Minimum total credits required for graduation	144
Number of elective courses required to take	33
Number of elective courses offered	131
Number of General Education Course components (MKWU)	14

General Information	Total Credit Point
Number of Skill-based Course components	52
Number of Basic Scientific Course components	59
Number of Scientific/Expertise Course components	169
Number of curricular/extracurricular activities promoting innovation, entrepreneurship, and IT skills	105
Number of course components aligned with SDGs vision	20

Table 3.11. Characteristics of Elective Courses

No	Code	Course	Credit Point	Characteristic (√)						
				A	B	C	D	E	F	G
1	SSTK6044	Population Statistics	2	√	√			√		
2	SSTK6040	Fuzzy System	2	√		√				√
3	SSTK6072	Operation Research I	3	√	√			√		
4	SSTK6050	Advanced Calculus	3	√						√
5	SSTK6068	Econometrics I	3		√					√
6	SSTK6067	Operation Research II	3	√		√		√		
7	SSTK6060	Geographic Information System	3			√		√		
8	SSTK6064	Management Information System	3	√	√					√
9	SSTK6052	Data Structure	3	√		√		√		
10	SSTK6056	Machine Learning	3	√	√	√		√		
11	SSTK6042	Official Statistics	2		√					√
12	SSTK6048	Operations and Business Management	2		√		√	√		
13	SSTK6041	Environmental Health Statistics	2	√	√					√
14	SSTK6043	Educational Measurement and Evaluation	2		√			√		
15	SSTK6063	Econometrics II	3	√	√					√
16	SSTK6051	Experimental Design II	3	√	√			√		
17	SSTK6078	Environmental Statistics	2		√			√		
18	SSTK6045	Introduction to	2		√			√		

No	Code	Course	Credit Point	Characteristic (√)						
				A	B	C	D	E	F	G
		Financial Analysis								
19	SSTK6059	Spatial Statistics	3	√	√	√		√		
20	SSTK6055	Disaster Statistics	3	√	√			√		√
21	SSTK6039	Epidemiology	2	√	√			√		√
22	SSTK6046	Introduction to Actuarial Science	2	√	√	√	√	√	√	
23	SSTK6082	Sosiometrics	2	√	√	√	√	√		
24	SSTK6047	Financial Analysis	3	√	√	√		√		
25	SSTK6106	Marketing Research	3	√	√	√	√	√		
26	SSTK6086	Statistical Business and Profession	2	√	√	√	√	√		√
27	SSTK6080	Item Response Theory	2	√	√			√		
28	SSTK6084	Public Policy Analysis	2	√	√	√		√		
29	SSTK6102	Statistical Quality Control II	3	√	√			√		√
30	SSTK6076	Longitudinal Data Analysis	2	√	√					√
31	SSTK6090	Computational Biostatistics	3	√		√		√		
32	SSTK6088	Forensic Statistics	3	√	√					
33	SSTK6110	Digital Business	3	√	√		√			
34	SSTK6073	Actuarial Science	2	√	√		√			
35	SSTK6075	Advanced Time Series Analysis	3	√						√
36	SSTK6079	Meta Analysis	3	√	√					√
37	SSTK6083	Big Data Programming	3		√	√		√		
38	SSTK6071	Health Data Analysis	2	√	√					√
39	SSTK6087	Business Intelligence and Data Analytic	3		√	√		√		
40	SSTK6091	Text Analysis	3	√		√		√		
41	SSTK6099	Structural Equation Modeling	2	√	√					√
42	SSTK6103	Statistical Modeling	3	√	√					√
43	SSTK6107	Survival Analysis	3	√						√

No	Code	Course	Credit Point	Characteristic (√)						
				A	B	C	D	E	F	G
44	SSTK6095	Artificial Intelligence	3		√	√		√		

A = Deepening of scientific field,
B = Enhancing skills/professionalism for career,
C = Improving IT skills,
D = Encouraging entrepreneurship,
E = Enhancing soft skills,
F = Can be equivalent to MBKM programs
G = Others
T = Tutorial
P = Practicum

Table 3.12 MBKM List of Courses Related to SDGs, PBR, PjBL, Case-M, and/or MBKM Implementation

No	Code	Course	Credit Point	Category	SDGs Target	Keterangan			
						PBR	PjBL	Case-M	MBKM
1	SMPA1009	Introduction to Industrial Revolution	2	W	√				
2	SSTK2020	Introduction to Biostatistics	2	W	√				
3	SSTK1006	Introduction to Ekonometrics	2	W	√				
4	SMPA3013	Entrepreneurship	2	W	√				√
5	SMPA3015	Entrepreneurship	1	W	√				
6	SSTK6044	Population Statistics	2	P	√				
7	SSTK6041	Environmental Health Statistics	2	P	√				
8	SSTK6055	Disaster Statistics	2	P	√				
9	SSTK6057	Disaster Statistics Practicum	1	P	√				
10	SSTK6084	Public Policy Analysis	2	P	√	√			
11	SSTK6071	Health Data Analysis	2	P	√				
12	SSTK3038	Colloquium	2	W		√			
13	SSTK2022	Survey Design	2	W		√	√		

No	Code	Course	Credit Point	Category	SDGs Target	Keterangan			
						PBR	PjBL	Case-M	MBKM
14	SSTK2024	Survey Design Practicum	1	W		√	√		
15	SSTK6043	Educational Measurement and Evaluation	2	W		√	√		
16	SSTK6079	Meta Analysis	2	P		√			
17	SSTK6081	Meta Analysis Survey Design	1	P		√			
18	SSTK6091	Text Analysis	2	P		√			
19	SSTK6093	Text Analysis Practicum	1	P					
20	SSTK6095	Artificial Intelligence	2	P		√			
21	SSTK6097	Artificial Intelligence Practicum	1	P		√			
22	SSTK3017	Research Methodology	3	W			√		√
23	SSTK2019	Introduction to Data Science	2	W			√		
24	SSTK2021	Introduction to Data Science Practicum	1	W			√		
25	SSTK2015	Sampling Technique	2	W			√		
26	SSTK2017	Sampling Technique Practicum	1	W			√		
27	SSTK2030	Multivariate Statistical Analysis	2	W			√		
28	SSTK2032	Multivariate Statistical Analysis Practicum	1	W			√		
29	SMPAP001	Internship	2	W				√	
30	SMPAPA01	Final Project	4	W				√	
31	SSTK6056	Machine Learning	2	P				√	

No	Code	Course	Credit Point	Category	SDGs Target	Keterangan			
						PBR	PjBL	Case-M	MBKM
32	SSTK6058	Machine Learning Practikum	1	P				√	
33	SSTK1008	Data Exploration and Visualization	1	W				√	
34	SSTK1010	Data Exploration and Visualization Practicum	1	W				√	
35	SSTK3021	Statistical Quality Control I	2	W					√
36	SSTK3023	Statistical Quality Control I Practicum	1	W					√
37	SSTK3029	Data Mining	2	W					√
38	SSTK3031	Data Mining Practikum	1	W					
39	SSTK6095	Artificial Intelligence	2	P					√
40	SSTK6097	Artificial Intelligence Practicum	1	P					√
41	SSTK6083	Big Data Programmin g	1	P					√
42	SSTK6085	Big Data Programmin g Practicum	2	P					√

3.8 List of Course Equivalency and Recognition of MBKM Program Toward Credit Acknowledgment

3.8.1 List of Course Equivalencies

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
1	MKS101	Indonesian Language	2 (2-0)	MKWU1003	Indonesian Language	2	(2-0)
2	MKS103	Pancasila and Civic Education	2 (2-0)	MKWU1002	Civic Education	2	(2-0)
3	MPA101	Introduction to Calculus	3 (3-0)	SMPA1001	Introduction to Calculus	3	(3-0)
4	MPA103	Introduction to Physics	3 (2-1)	SMPA1003	Introduction to Physics	2	(2-0)
				SSTK6033	Introduction to Physics Practicum	1	(0-1)
5	MPA105	Introduction to Chemistry	3 (2-1)	SMPA1005	Introduction to Chemistry	2	(2-0)
				SSTK6035	Introduction to Chemistry Practicum	1	(0-1)
6	MPA107	Introduction to Biology	3 (2-1)	SMPA1007	Introduction to Biology	2	(2-0)
				SSTK6037	Introduction to Biology Practicum	1	(0-1)
7	MPA109	Introduction to Information and Communication Technology	2 (2-0)	SMPA1009	Introduction to Industrial Revolution	2	(2-0)
8	MKS104	Social and Cultural Sciences	2 (2-0)	MKWU1001	Pancasila	2	(2-0)
9	MKS105	Religion Education	2 (2-0)	MKWU2001	Religion Education	2	(2-0)
10	MKS106	Disaster and Environmental Knowledge	2 (2-0)	MKWU1005	Disaster and Environmental Management	2	(2-0)
11	MKS107	Character Building I	0 (0-0)	MKWU1006	Character Building I	0	(0-0)
12	MPAP02	Introduction to Statistics	3 (2-1)	SMPA1011	Statistical Methods	2	(2-0)
				SSTK1001	Statistical Methods Practicum	1	(0-1)
13	STK106	Matrix Algebra	3 (3-0)	SSTK1004	Matrix Algebra	3	(3-0)
14	STK108	Algorithms and Programming	3 (2-1)	SSTK1012	Algorithms and Programming	2	(2-0)
				SSTK1014	Algorithms and Programming Practicum	1	(0-1)
15	STK114	Calculus I	3 (3-0)	SSTK1002	Calculus	4	(4-0)
16	STK112	Scientific Paradigm and Communication	2 (2-0)	SSTK1003	Wawasan Ilmu	2	(2-0)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
					Scientific Paradigm and Communication		
17	MKS201	English	2 (2-0)	MKWU1004	English	2	(2-0)
18	MKS202	Character Building II	0 (0-0)	MKWU1007	Character Building II	0	(0-0)
19	STK211	Statistical Theory I	3 (3-0)	SSTK2005	Statistical Theory I	3	(3-0)
20	STK221	Calculus II	3 (3-0)	SSTK2009	Numerical Methods	2	(2-0)
21	STK116	Exploratory Data Analysis	2 (1-1)	SSTK1008	Data Exploration and Visualization	1	(1-0)
				SSTK1010	Data Exploration and Visualization Practicum	1	(0-1)
				SSTK2007	Nonparametric Statistics	2	(2-0)
22	STK217	Regression Analysis	3 (2-1)	SSTK2011	Regression Analysis	2	(2-0)
				SSTK2013	Regression Analysis Practicum	1	(0-1)
				SSTK1006	Introduction to Ekonometrics	2	(2-0)
23	STK223	Introduction to Data Science	3 (2-1)	SSTK2019	Introduction to Data Science	2	(2-0)
				SSTK2021	Introduction to Data Science Practicum	1	(0-1)
24	STK225	Database and Data Search – SQL	3 (2-1)	SSTK2023	Database and Data Search – SQL	2	(2-0)
				SSTK2025	Database and Data Search – SQL Practicum	1	(0-1)
25	STK312	Statistical Computation and Simulation	3 (2-1)	SSTK3024	Statistical Computation and Simulation	3	(3-0)
26	MPAP03	Entrepreneurship	2 (2-0)	SMPA3013	Entrepreneurship	2	(2-0)
				SMPA3015	Entrepreneurship Practicum	1	(0-1)
				SSTK3019	Introduction to Digital Business	2	(2-0)
27	STK208	Statistical Theory II	3 (3-0)	SSTK2016	Statistical Theory II	3	(3-0)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
28	STK212	Experimental Design I	3 (2-1)	SSTK2026	Experimental Design I	2	(2-0)
				SSTK2028	Experimental Design I Practicum	1	(0-1)
29	STK214	Sampling Technique	3 (2-1)	SSTK2015	Sampling Technique	2	(2-0)
				SSTK2017	Sampling Technique Practicum	1	(0-1)
				SSTK2022	Survey Design	1	(1-0)
				SSTK2024	Survey Design Practicum	1	(0-1)
30	STK305	Multivariate Statistical Analysis	3 (2-1)	SSTK2030	Multivariate Statistical Analysis	2	(2-0)
				SSTK2032	Multivariate Statistical Analysis Practicum	1	(0-1)
				SSTK3036	Capita Selecta	2	(2-0)
31	STK309	Research Methodology	2 (2-0)	SSTK3017	Research Methodology	2	(2-0)
				SSTK2020	Introduction to Biostatistik	2	(2-0)
32	STK216	Data Mining	3 (2-1)	SSTK3029	Data Mining	2	(2-0)
				SSTK3031	Data Mining Practikum	1	(0-1)
33	STK313	Kategorical Data Analysis	3 (3-0)	SSTK2018	Kategorical Data Analysis	3	(3-0)
34	STK315	Statistical Quality Control I	3 (2-1)	SSTK3021	Statistical Quality Control I	2	(2-0)
				SSTK3023	Statistical Quality Control I Practicum	1	(0-1)
35	STK308	Time Series Analysis I	3 (2-1)	SSTK3025	Time Series Analysis	2	(2-0)
				SSTK3027	Time Series Analysis Practicum	1	(0-1)
36	STK310	Colloquium	2 (2-0)	SSTK3038	Colloquium	2	(2-0)
37	MKSP02	Community Service	2 (0-2)	MKWUP001	Community Service	2	(0-2)
38	MPAPA1	Research Proposal	2 (0-2)	SMPAP001	Research Proposal	2	(0-2)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
39	STK577	Capita Selecta	2 (2-0)	SSTK6115	Advanced Capita Selecta	2	(2-0)
40	MPAPA2	Final Project	4 (0-4)	SMPAPA01	Research Proposal	4	(0-4)
41	STK501	Ecological Statistics	2 (2-0)	SSTK6078	Environmental Statistics	2	(2-0)
42	STK507	Demography	2 (2-0)	SSTK6044	Population Statistics	2	(2-0)
43	STK587	Educational Measurement and Evaluation	2 (2-0)	SSTK6043	Educational Measurement and Evaluation	2	(2-0)
44	STK576	Biometrics	3 (2-1)	SSTK6088	Forensic Statistics	3	(3-0)
45	STK570	Statistical Quality Control II	3 (2-1)	SSTK6102	Statistical Quality Control II	2	(2-0)
				SSTK6104	Statistical Quality Control II Practicum	1	(0-1)
46	STK519	Ekonometrics II	3 (2-1)	SSTK6063	Ekonometrics II	2	(2-0)
				SSTK6065	Ekonometrics II Practikum	1	(0-1)
47	STK574	Survival and Reliability Analysis	3 (3-0)	SSTK6110	Digital Business	2	(2-0)
				SSTK6112	Digital Business Practicum	1	(0-1)
48	STK523	Fuzzy System	2 (2-0)	SSTK6040	Fuzzy System	2	(2-0)
49	STK525	Actuarial Sciences	2 (2-0)	SSTK6047	Financial Analysis	3	(3-0)
50	STK531	Time Series Analysis II	3 (2-1)	SSTK6075	Advanced Time Series Analysis	2	(2-0)
				SSTK6077	Advanced Time Series Analysis Practicum	1	(0-1)
51	STK535	Experimental Design II	3 (2-1)	SSTK6051	Experimental Design II	2	(2-0)
				SSTK6053	Experimental Design II Practicum	1	(0-1)
52	STK537	Numerical Methods	3 (2-1)	SSTK6094	Advanced Numerical Methods	2	(2-0)
				SSTK6096	Advanced Numerical Methods Practicum	1	(0-1)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
53	STK561	Microeconometrics	3 (2-1)	SSTK6046	Introduction to Actuarial Science	2	(2-0)
54	STK562	Introduction to Biostatistics and Epidemiology	3 (2-1)	SSTK6090	Computational Biostatistics	2	(2-0)
				SSTK6092	Computational Biostatistics Practicum	1	(0-1)
55	STK543	Operations Research I	3 (2-1)	SSTK6072	Operations Research I	2	(2-0)
				SSTK6074	Operations Research I Practicum	1	(0-1)
56	STK545	Nonparametric Statistics	3 (2-1)	SSTK6098	Advanced Nonparametric Statistics	2	(2-0)
				SSTK6100	Advanced Nonparametric Statistics Practicum	1	(0-1)
57	STK547	Introduction to Linear Model	2 (2-0)	SSTK6073	Actuarial Sciences	2	(2-0)
58	STK568	Operations Management	2 (2-0)	SSTK6048	Operations and Business Management	2	(2-0)
59	STK551	Survey Design	2 (1-1)	SSTK6041	Environmental Health Statistics	2	(2-0)
60	STK575	Text Analysis	3 (2-1)	SSTK6091	Text Analysis	2	(2-0)
				SSTK6093	Text Analysis Practicum	1	(0-1)
61	STK555	Introduction to Financial Analysis	2 (2-0)	SSTK6045	Introduction to Financial Analysis	2	(2-0)
62	STK557	Meta Analysis	3 (2-1)	SSTK6079	Meta Analysis	2	(2-0)
				SSTK6081	Meta Analysis Practicum	1	(0-1)
63	MPAP04	Internship	3 (0-3)	SMPAP002	Internship	3	(0-3)
64	STK502	Kalkulus Lanjut	3 (3-0)	SSTK6050	Advanced Calculus	3	(3-0)
65	STK510	Ekonometrics I	3 (2-1)	SSTK6068	Ekonometrics I	2	(2-0)
				SSTK6070	Ekonometrics I Practicum	1	(0-1)
66	STK516	Sosiometrics	2 (2-0)	SSTK6082	Sosiometrika	2	(2-0)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
67	STK566	Official Statistics	2 (2-0)	SSTK6042	Official Statistics	2	(2-0)
68	STK520	Operations Research II	3 (2-1)	SSTK6067	Operations Research II	2	(2-0)
				SSTK6069	Operations Research II Practicum	1	(0-1)
69	STK522	Stochastic Processes	3 (3-0)	SSTK6111	Stochastic Processes	2	(2-0)
				SSTK6113	Advanced Capita Selecta	2	(2-0)
70	STK524	Geographic Information System	3 (2-1)	SSTK6060	Geographic Information System	2	(2-0)
				SSTK6062	Geographic Information System Practicum	1	(0-1)
71	STK526	Marketing Research	3 (2-1)	SSTK6106	Marketing Research	2	(2-0)
				SSTK6108	Marketing Research Practicum	1	(0-1)
72	STK585	Artificial Intelligence	3 (2-1)	SSTK6095	Artificial Intelligence	2	(2-0)
				SSTK6097	Artificial Intelligence Practicum	1	(0-1)
73	STK536	Management Information System	3 (2-1)	SSTK6064	Management Information System	2	(2-0)
				SSTK6066	Management Information System Practicum	1	(0-1)
74	STK538	Statistical Business and Profession	2 (2-0)	SSTK6086	Statistical Business and Profession	2	(2-0)
75	STK565	Disaster Statistics	3 (2-1)	SSTK6055	Disaster Statistics	2	(2-0)
				SSTK6057	Disaster Statistics Practicum	1	(0-1)
76	STK567	Epidemiology	2 (2-0)	SSTK6039	Epidemiology	2	(2-0)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
77	STK581	Statistical Modeling	3 (2-1)	SSTK6103	Statistical Modeling	2	(2-0)
				SSTK6105	Statistical Modeling Practicum	1	(0-1)
78	STK546	*Item Response Theory*	2 (2-0)	SSTK6080	*Item Response Theory*	2	(2-0)
79	STK548	Linear Model	3 (3-0)	SSTK6049	Linear Model	3	(3-0)
80	STK579	Structural Equation Modeling	2 (1-1)	SSTK6099	Structural Equation Modeling	1	(1-0)
				SSTK6101	Structural Equation Modeling Practicum	1	(0-1)
81	STK552	Public Policy Analysis	2 (2-0)	SSTK6084	Public Policy Analysis	2	(2-0)
82	STK569	Big Data Programming	3 (1-2)	SSTK6083	Big Data Programming	1	(1-0)
				SSTK6085	Big Data Programming Practicum	2	(0-2)
83	STK563	Spatial Statistics	3 (2-1)	SSTK6059	Spatial Statistics	2	(2-0)
				SSTK6061	Spatial Statistics Practicum	1	(0-1)
84	STK583	Survival Analysis	3 (2-1)	SSTK6107	Survival Analysis	2	(2-0)
				SSTK6109	Survival Analysis Practicum	1	(0-1)
85	STK560	Data Structure	3 (2-1)	SSTK6052	Data Structure	2	(2-0)
				SSTK6054	Data Structure Practicum	1	(0-1)
86	STK564	Introduction to Machine Learning	3 (2-1)	SSTK6056	Machine Learning	2	(2-0)
				SSTK6058	Machine Learning Practicum	1	(0-1)
87	STK572	Community Epidemiology	2 (2-0)	SSTK6076	Longitudinal Data Analysis	2	(2-0)
88	STK571	Health Data Analysis	2 (2-0)	SSTK6071	Health Data Analysis	2	(2-0)

	2021 Curriculum			2024 OBE Curriculum			
No.	**Code**	**Course**	**Credit Point (K-P)**	**Code**	**Course**	**Credit Point**	**Credit Point (K-P)**
89	STK573	Business Intelligence and Data Analytics	3 (2-1)	SSTK6087	Business Intelligence and Data Analytic	2	(2-0)
				SSTK6089	Business Intelligence and Data Analytic Practicum	1	(0-1)
90	MPAP05	Entrepreneurial Practice	18 (0-18)	SMPAP003	Entrepreneurial Practice	17	(0-17)
91	MPAP06	Scientific Publication	11 (0-11)	SMPAP004	Scientific Publication	11	(0-11)
92	MPAP07	Industrial Internship A	17 (0-17)	SMPAP005	Industrial Internship A	17	(0-17)
93	MPAP08	Industrial Internship A	11 (0-11)	SMPAP006	Industrial Internship B	11	(0-11)
94	MPAP09	Industrial Internship C	5 (0-5)				
95	MPAP10	Village Project A	18 (0-18)	SMPAP007	Village Project A	18	(0-18)
96	MPAP11	Village Project A	12 (0-12)	SMPAP008	Village Project B	12	(0-12)
97	MPAP12	Village Project A	6 (0-6)				
98	MPAP13	Science Teaching Practice A	18 (0-18)	SMPAP009	Science Teaching Practice A	18	(0-18)
99	MPAP14	Science Teaching Practice B	12 (0-12)	SMPAP010	Science Teaching Practice B	12	(0-12)
100	MPAP15	Science Teaching Practice A	6 (0-6)				

3.8.2 List of Course Recognition *(If elective courses do not meet 20% of the total 144 SKS)*

The number of courses that can be recognized for entry into an educational level is 30% of the total number of courses. Examples of items that can be recognized for credit equivalence at an educational level include: a certificate of work experience, language certificates, professional competency certificates issued by BNSP, professional associations or other institutions recognized by the study program, or certificates from training institutions that are nationally or internationally recognized or accredited, or other similar examples acknowledged by the study program. Recognition is conducted by a team appointed by a Rector's Decree, consisting of the Study Program Coordinator, TPMA, and one or more faculty members.

List of Courses Recognized under the MBKM Program						
No	**Code**	**Course**	**Credit Point**	**(T-P)**	**Category**	**Requirement**
1	SMPAP003	Entrepreneurial Practice (sm.5)	18	(0 - 18)	P	-
2	SMPAP004	Scientific Publication (sm.6)	11	(0 - 11)	P	-
3	SMPAP005	Industrial Internship A (sm.5)	17	(0 - 17)	P	-
4	SMPAP006	Industrial Internship B (sm.6)	11	(0 - 11)	P	-
5	SMPAP007	Village Project A (sm.5)	18	(0 - 18)	P	-
6	SMPAP008	Village Project B (sm.6)	12	(0 - 12)	P	-
7	SMPAP009	Science Teaching Practice A (sm.7)	18	(0 - 18)	P	-
8	SMPAP010	Science Teaching Practice B (sm.6)	12	(0 - 12)	P	-

Code & Name of Compulsory/Elective Courses	**MBKM Program**	**Code & Name of MKRU**
SMPA 3101 - Entrepreneurship (2 SKS)	Independent Study with the Department of Communication, Informatics, and Cryptography	MKWU1002 - Community Services (2SKS)
SSTK 3001 - Research Methodology (2SKS)		MKWU 1005 - Disaster and Environmental Management (2SKS)
SSTK 3105 - Statistical Quality Control I (3 SKS)		
SSTK 2109 - Data Mining (2 SKS)		
SSTK 3107 - Time Series Analysis (3SKS)		
SSTK 3003 - Introduction to Digital Business (2SKS)		
SSTK 6106 -Geographic Information System (2SKS)		
SMPA 3101 - Entrepreneurship(2 SKS)	Desa Cantik with Statistics Indonesia	MKWU1002 - Community Services (2SKS)
SSTK 3001 - Research Methodology(2SKS)		MKWU 1005 - Disaster and Environmental Management (2SKS)
SSTK 3105 - Statistical Quality Control I (3 SKS)		
SSTK 2109 - Data Mining (2 SKS)		

Code & Name of Compulsory/Elective Courses	MBKM Program	Code & Name of MKRU
SSTK 6006 - Population Statistics (2SKS)		
SSTK 6004 - Official Statistics (2SKS)		
SMPA 3101 - Entrepreneurship (2 SKS)	Industrial Internship and Independent Study	MKWU1002 - Community Services (2SKS)
SSTK 3001 - Research Methodology (2SKS)		MKWU 1005 - Disaster and Environmental Management (2SKS)
SSTK 3105 - Statistical Quality Control I (3 SKS)		
SSTK 2109 - Data Mining (2 SKS)		
SSTK 6104 - Machine Learning (3 SKS)		
SSTK 6115 - Big Data Programming (3 SKS)		
STK 585-Artificial Intelligence (3 SKS)		

3.9 Example of RPS Using Case Method and Team-Based Project (Project-Based Learning/PjBL) for Study Program

The example of RPS for the **Introduction to Data Science** course in Undergraduate Study Program in Statistics can be found at the following link:
https://docs.google.com/spreadsheets/d/1AowPbBgMUq1v9PGwPGYd-MBwHxIXx-4g/edit?gid=518480874#gid=518480874

UNIVERSITAS SYIAH KUALA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
BACHELOR IN STATISTICS PROGRAM

Document Code: 49201-019-01-00

SEMESTER LEARNING PLAN

Course	Course Code	Category	Required	Course Cluster	Weight (ECTS)		Semester	Date of Compilation
INTRODUCTION TO DATA SCIENCE	SSTK2019	COMPULSORY	-	BASIC DATA SCIENCE	T=3.2	P=1.6	II	Tuesday, March 05, 2024

	RPS Developer Coordinator	Course Coordinator	Study Program Coordinator
Authorization	Chair of the Computational Statistics Peer Group	Ridha Ferdhiana, S.Si, M.Sc	Prof. Dr. Yamilla Marli Kesuma, S.Si., M.Si.

Lecturer	Ridha Ferdhiana, S.Si, M.Sc; Latifah Rahayu Siregar, S.Si, M.Sc; Novi Reandy Sasmita, S.Si, M.Sc; Dr. Rumaisa Kruba, S.Si,
Course Description	This course serves as the foundation for learning how to use R and Python software to perform various computations and statistical analyses. The course is conducted using a project-based learning system, where students form working groups and then submit reports and present their work.

Learning Outcomes

ILO assigned to The Course	
CPL-3	Skilled in solving real-world problems in a simple and practical manner, able to analyze and interpret data processing results.
CPL-4	Able to work and take responsibility for the results of independent and group work at the local, regional, and global levels
Course Learning Outcomes (CLO)	
CPMK-2	Apply descriptive and inferential statistical analysis to various types of data.
CPMK-4	Able to use open source and licensed software, such as MS Excel, Tableau, Minitab, SPSS, E-Views, Stata, R, and Python, to process and analyze data.
CPMK-5	Able to perform data analysis on real-world problems using appropriate statistical methods and communicate the results effectively
sub-CPMK-01	Ability to perform data exploration using R and Python software;

Correlation Matrix Between ILO and CLO

Correlation Between ILO and CLO

CPMK	ILO(%)		Bobot CPMK (%)
	CPL-3	CPL-4	
CPMK-2	10	0	10
CPMK-4	20	0	20
CPMK-5	10	30	40
sub-CPMK-01	10	20	30
Bobot CPL (%)	**50**	**50**	**100**

Matrix of CLO Alignment with University Vision, SDGs, and Research-Based Learning (RBL)

Correlation between CLO and University Vision, SDGs, and RBL

Aspect	CLO			
	CPMK-2	CPMK-4	CPMK-5	sub-CPMK-01
Sosio-Technopreneur	-	-	-	-
SDGs	-	-	-	-
Research Based Learning (RBL)	-	-	-	V

3.10 Example of Course Contract for the Study Program

Example of the Lecture Contract for the "Introduction to Data Science" course in the Undergraduate Statistics Study Program can be viewed at the following link: https://docs.google.com/document/d/1hfT-QKXaWWjgWApKD3mftBurRUSh3LDP/edit#heading=h.v9i2b1z6ksls

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Course Title	: Introduction to Data Science Practicum
Course Code	: SSTK2021
Credit Points	: 1.6 ECTS
Semester	: 3rd Semester
Course Status	: Compulsory
Class	: -
Class session	: Friday, 14.00- 15.40
Classroom	: Computational Laboratory
Course Coordinator	: Ridha Ferdhiana, S.Si., M.Sc.
Course Teaching Team	: 1. Ridha Ferdhiana, S.Si., M.Sc., Dr. Rumaisa Kruba, S.Si.

1. Course Outcome

Upon completion of this course, students are expected to be able to:
1) Mastering the skills of operating R and Python software to perform various computations and statistical analyses.

2. Course Description

This course serves as the foundation for learning how to use R and Python software to perform various computations and statistical analyses. The course is conducted using a project-based learning system, where students form working groups and then submit reports and present their work.

3. Intended Learning Outcome

CPL-2 Skilled in solving real-world problems in a simple and practical manner, able to analyze and interpret data processing results.

CPL-3 Skilled in solving real-world problems in a simple and practical manner, able to analyze and interpret data processing results and quality control.

4. Teaching Method

1) Lecture
2) Question and answer session between lecturer and students accompanied by lab assistants
3) Presentation of sample questions related to the material and practiced in the lab
4) Practical questions completed by students with the help of R and Python software, then corrected by lab assistants.
5) Demonstration of R and Python software by students

6) Use of e-learning, Google Classroom, and Zoom for practical exercises and evaluation.

5. Main Topic

1) Introduction to R and Python, including installation and basic syntax
2) Data exploration and description, statistical distributions and sampling distributions, hypothesis testing and ANOVA using R and Python
3) Linear regression, logistic regression, Naïve Bayes, and discriminant analysis using R and Python
4) Introduction to machine learning concepts Classification using R and Python
5) Introduction to clustering concepts using R and Python

6. Reference

1) Peter Bruce, Andrew Bruce, and Peter Gedeck, 2020, Practical Statistics for Data Scientists, O'Reilly Media Inc
2) Wes McKinney, 2017, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython 2nd Edition, O'Reilly MediaInc
3) Introduction to Data Science Data Analysis and Prediction Algorithms with R, Rafael A. Irizarry

7. Assignment

1) The assignments consist of both group and individual tasks.
2) They are given every week with a clear due date, and late submission will result in a grade deduction.
3) The assignments include creating a summary, a presentation file, and a project.
4) They must be presented and discussed in class.

8. Assessment Criteria and Standards

The Final Grade (FG) for each student is determined based on performance:

Attendance (A)	: 10%
Team-Based Project (TBP)	: 50%
Assignment (T1, T2, T3)	: 10%
Midterm Exam (M)	: 15%
Final Exam (F)	: 15%

The Final Grade (FG) is calculated using the following formula:

$$FG = A + TBP + Q + M + F = 100\%$$

The Final Grade category uses the following standards:

Score Range	Grade Letter	Category	Passing Status
≥87	A	Excellent	PASS
78 - <87	AB	Very Good	
69 - <78	B	Good	
60 - <69	BC	Fair	
51 - <60	C	Average	
41 - <51	D	Poor	FAIL
<41	E	Fail	

9. Student and Lecturer Code of Conduct

Lecturer:

(1). Attend and leave the laboratory on time.
(2). Dress appropriately according to religious and cultural customs.
(3). Behave and speak in a manner that is not discriminatory and does not oppose Pancasila and the Unitary State of the Republic of Indonesia.
(4). Obey laboratory instructions and rules.
(5). Do not change or swap laboratory schedules (unless absolutely necessary).
(6). Attend 100% of laboratory sessions in one semester.
(7). Follow the academic guidelines of USK and the Faculty of Mathematics and Natural Sciences.
(8). Classes are not permitted on holidays, except in cases of extreme necessity.

Student:

(1). Attend and leave the laboratory on time.
(2). Dress appropriately according to religious and cultural customs.
(3). In behavior and speech, do not exhibit discriminatory attitudes or oppose the Pancasila and the Unitary State of the Republic of Indonesia.

(4). Do not use mobile phones or other communication devices during laboratory sessions and exams.
(5). Do not cause disturbances or noise.
(6). Follow laboratory guidelines and regulations.
(7). Attendance in laboratory sessions for one semester must be at least 75% of the 12 scheduled sessions.
(8). Follow the academic guidelines of USK and the Faculty of Mathematics and Natural Sciences.
(9). Do not dirty the laboratory room.
(10). Turn off the electricity and water, and clean the tables and laboratory room.
(11). Do not engage in activities unrelated to the laboratory course.
(12). Make-up exams or laboratory sessions may be conducted if the applicable requirements and conditions are met and evidence can be provided.

10. Course Outline

Dosen Pengampu : 1. Ridha Ferdhiana, S.Si., M.Sc. (RDF)
2. Dr. Rumaisa Kruba, S.Si. (RMK)

No.	Main Topic	Week	Lecturer
1.	R and Python; How to install R and Python, Simple syntax	5	RDF
2.	Sampling, confidence intervals, Normal distribution, t, Chi-square, F, Binomial, and Poisson	6	RDF
3.	Data exploration, graphing/tabulating, sampling, viewing data distribution	7	RDF
4.	Resampling, p-value, t-test, chi-square test, F-test	8	RDF
5.	Simple and multiple linear regression, regression parameter estimation, ANOVA and parameter testing, prediction	9	RDF
6.	Midterm Exam	10	RDF
7.	Naïve Baye's	11	RMK
8.	Discriminant Analysis	12	RMK
9	Logistic Regression dan Confusion Matrix	13	RMK
10.	KNN	14	RMK
11.	Decision Tree	15	RMK
12	Final Exam	16	RMK

11. Assessment

A. Attitude Assessment

The assessed attitude aspects include discipline, integrity, teamwork, and responsibility

1) Discipline

No.	Observations Aspects	Score			
		4	3	2	1
1	Punctual attendance in class				
2	Timely submission of assignments				
3	Wearing attire appropriate to the teaching profession				
4	Orderly conduct during lectures				

2) Integrity

No.	Observations Aspects	Score			
		4	3	2	1
1	Refraining from cheating during examinations				
2	Avoiding plagiarism in completing assignments				
3	Reporting data and information accurately				
4	Acknowledging one's mistakes or shortcomings				

3) Responsibility

No.	Observations Aspects	Score			
		4	3	2	1
1	Carrying out individual assignments effectively				

2	Writing in accordance with the references consulted				
3	Writing concepts in accordance with scientific principles				
4	Accepting responsibility for mistakes made				

4) **Teamwork**

No.	Observations Aspects	Score			
		4	3	2	1
1	Active participation in group activities				
2	Perseverance in accomplishing the best possible group work				
3	Willingness to help complete tasks as agreed				
4	Willingness to help peers or others				

Attitude Assessment Rubric

- *Score 4 = Always, when always performing according to the statement.*
- *Score 3 = Often, when often performing according to the statement, and occasionally failing to do so*
- *Score 2 = Sometimes, when sometimes performing according to the statement, and often not.*
- *Score 1 = Never, when never performing according to the statement*

Each **attitude aspect** is scored using the following formula:

$$\text{Attitude Grade} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

B. General Skill Assessment

The students' general skills are assessed through independent assignments involving paper writing and an assessment instrument.

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Independent Task Assessment

No.	Assessment Aspects	Score		
		3	2	1
1	Selection of the theory used			
2	Alignment between the developed instrument and the indicators			
3	Relevance of the generated statements/questions to each indicator			
4	Scoring guidelines			
5	Instrument presentation			

Presentation Skills Assessment

No.	Assessment Aspects	Score			
		4	3	2	1
1	Quality of presentation materials/ powerpoint				
2	Clarity of presentation				
3	Presentation knowledge				

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Presentation Skills Assessment Rubric:

No.	Assessment Aspects	Score			
		4	3	2	1
1	Quality of presentation materials/ powerpoint	Very attractive, comprehensive, and clear presentation materials	Fairly attractive and comprehensive presentation materials, but lacking clarity	Less attractive, comprehensive, but lacking clarity	Unattractive, comprehensive, but lacking clarity
2	Clarity of presentation	Explanation is systematic and logical, delivered in very clear language and voice	Explanation is less systematic and logical, but delivered in very clear language and voice	Explanation is not systematic or logical, delivered in unclear language and voice	Explanation is not systematic or logical, delivered in unclear language and voice
3	Presentation knowledge	Demonstrates excellent mastery of the presentation material and answers questions comprehensively	Demonstrates good mastery of the presentation material and answers questions completely	Demonstrates limited mastery of the presentation material and does not answer questions completely	Demonstrates limited mastery of the material and answers questions, though incompletely

Presentation skills grade is calculated using the formula

$$\text{Presentation skills grade} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100$$

C. Specific Skills Assessment

The assessment of paper originality is conducted using the following rubric

Paper Originality Assessment Rubric:

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Paper Originality Assessment Rubric:	
Score: 4 Points	**Very Creative**
• The paper presents a highly unique and complex idea (the developed instrument shares ≤ 10% similarity with other students' papers in the course)	
Score: 3 Points	**Creative**
• The paper presents a unique and complex idea (the developed instrument shares ≤ 25% similarity with other students' papers in the course).	
Score: 2 Points	**Moderately Creative**
• The paper presents a fairly unique and complex idea (the developed instrument shares ≤ 50% similarity with other students' papers in the course).	
Score: 1 Point	**Limited Creativity**
• The paper presents a less unique and complex idea (the developed instrument shares > 50% similarity with other students' papers in the course).	

Paper Originality Score is calculated using the formula:

$$\text{Paper Originality Grade} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

12. Others

If there are matters beyond the scope of this agreement that are deemed necessary, they may be discussed in detail during each class meeting. Should any changes to the content of this course contract be considered necessary, they will be deliberated beforehand. This course contract shall take effect upon being presented and signed by both parties.

Banda Aceh, 4 September 2024

Party I
Lecturer,

Party II
Student Representative

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Acknowledged by,
Study Program Coordinator

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CHAPTER 4
LEARNING PROGRAM EVALUATION DESIGN

4.1 Relationship between Graduate Profile and Intended Learning Outcomes

The graduate profile reflects the description of the expected attitudes, knowledge, general skills, and specific skills that graduates of a Statistics Program should possess. Intended Learning outcomes (ILO) are specific descriptions of what graduates should be able to achieve in terms of competencies, skills, knowledge, and attitudes upon completing the educational program. To establish the relationship between the graduate profile and the learning outcomes, the study program needs to develop a matrix as shown in Table 4.1 below.

Table 4.1. Matrix of the Relationship between Graduate Profile and Intended Learning Outcomes

Graduate Profile	PL-01	PL-02	PL-03
CPL-01	H	M	L
CPL-02	H	M	L
CPL-03	H	M	L
CPL-04	H	M	L
CPL-05	M	H	L
CPL-06	M	H	L
CPL-07	L	M	H
CPL-08	L	M	H

**The assignment of ILO and GP codes is determined by each respective study program.*
** Note : L = Low (0-40) M = Medium (41-70); H = High (71-100)*

To track graduate competencies, the following matrix showing the relationship between SKL (SNDIKTI/KKNI) and the Intended Learning Outcomes (ILO) can be used as reference.

Table 4.2. Matrix Showing the relationship between ILO (SNDikti/KKNI) and SKL Components (Attitudes, Knowledge, General Skills, Specific Skills). *SKL*, as defined in SNDikti, is essentially equivalent to ILO.

Competency (SKL)*	CPL-01	CPL-02	CPL-03	CPL-04	CPL-05	CPL-06	CPL-07	CPL-08
Attitudes (A)					√	√		
Knowledge (K)	√	√	√	√				
General Skills (GU)					√	√	√	√
Specific Skills (GS)	√	√	√	√				

*Under Ministry of Education, Culture, Research, and Technology Regulation No. 53 of 2023, it is not mandatory to detail every Course Learning Outcomes (CLO).

4.2 Relationship Between Courses and Intended Learning Outcomes (ILO)

The Relationship Between Courses and Intended Learning Outcomes can be traced through the calculation of weight for each ILO relevant to the respective courses. The Weight Calculation Matrix of IntendedLearning Outcomes for the Statistics Program is as follows.

Table 4.3. ILO Weight Calculation Matrix for the Undergraduate Statistics Program USK

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
1	I	MKWU1002	Civic Education	2	0	0	0	0	2	0	0	0	2
2		MKWU1005	Disaster and Environmental Management	2	1	0	0	0	0	1	0	0	2
3		MKWU1006	Character Building I	3	3	0	0	0	0	0	0	0	3
4		SMPA1001	Introduction to Calculus	2	2	0	0	0	0	0	0	0	2
5		SMPA1003	Introduction to Physics	2	2	0	0	0	0	0	0	0	2
6		SMPA1005	Introduction to Chemistry	2	2	0	0	0	0	0	0	0	2
7		SMPA1007	Introduction to Biology	2	1	0.5	0.5	0	0	0	0	0	2
8		SMPA1009	Introduction to Industrial Revolution	1	0	0.5	0.5	0	0	0	0	0	1
9		SMPA1011	Statistical Methods	2	1	0	0	0	0	0.5	0	0.5	2
10		SSTK1001	Statistical Methods Practicum	2	1	0	0	0	0	1	0	0	2
11	II	MKWU1001	Pancasila	2	1	0	0	0	1	0	0	0	2
12		MKWU1003	Indonesian Language	2	1	0	0	0	1	0	0	0	2
13		MKWU1004	English	2	1	0	0	0	1	0	0	0	2
14		MKWU1007	Data Exploration and Visualization	1	0	0.5	0.5	0	0	0	0	0	1
15		SSTK1002	Data Exploration and Visualization	1	0	0.5	0.5	0	0	0	0	0	1

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
			Practicum										
16		SSTK1004	Algorithms and Programming	2	0	1	1	0	0	0	0	0	2
17		SSTK1006	Algorithms and Programming Practicum	1	0	0.5	0.5	0	0	0	0	0	1
18		SSTK1008	Matrix Algebra	3	3	0	0	0	0	0	0	0	3
19		SSTK1010	Introduction to Econometrics	2	1	0	1	0	0	0	0	0	2
20		SSTK1012	Calculus	4	4	0	0	0	0	0	0	0	4
21		MKWU2001	Religion Education	2	1	0	0	0	1	0	0	0	2
22		SSTK2005	Statistical Theory I	3	3	0	0	0	0	0	0	0	3
23		SSTK2007	Nonparametric Statistics	2	0	1	1	0	0	0	0	0	2
24		SSTK2009	Numerical Methods	1	0	0.5	0.5	0	0	0	0	0	1
25		SSTK2011	Regression Analysis	2	0	1	1	0	0	0	0	0	2
26	**III**	SSTK2013	Regression Analysis Practicum	1	0	0.5	0.5	0	0	0	0	0	1
27		SSTK2015	Sampling Technique	2	0	1	1	0	0	0	0	0	2
28		SSTK2017	Sampling Technique Practicum	1	0	0.5	0.5	0	0	0	0	0	1
29		SSTK2019	Introduction to Data Science	2	0	1	1	0	0	0	0	0	2
30		SSTK2021	Introduction to Data Science Practicum	1	0	0.5	0.5	0	0	0	0	0	1
31		SSTK2023	Database and Data Search – SQL	2	1	0	1	0	0	0	0	0	2
32		SSTK2016	Statistical Theory II	2	1	0	1	0	0	0	0	0	2
33	**IV**	SSTK2018	Categorical Data Analysis	3	3	0	0	0	0	0	0	0	3
34		SSTK2020	Introduction to Biostatistics	2	0	1	1	0	0	0	0	0	2

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
35		SSTK2022	Survey Design	1	0	0.5	0.5	0	0	0	0	0	1
36		SSTK2024	Survey Design	2	0	1	1	0	0	0	0	0	2
37		SSTK2026	Experimental Design I	1	0	0.5	0.5	0	0	0	0	0	1
38		SSTK2028	Experimental Design I Practicum	3	0	1.5	1.5	0	0	0	0	0	3
39		SSTK2030	Multivariate Statistical Analysis	1	0	0.5	0.5	0	0	0	0	0	1
40		SSTK2032	Multivariate Statistical Analysis Practicum	1	0	0.5	0.5	0	0	0	0	0	1
41		SSTK2016	Introduction to Biostatistics	2	0.5	0	0.5	1	0	0	0	0	2
42	V	SMPA3013	Entrepreneurship	2	0	0	0	0	0	0	2	0	2
43		SMPA3015	Entrepreneurship Practicum	1	0	0	0	0.5	0	0	0.5	0	1
44		SSTK3017	Research Methodology	2	0	0	1	1	0	0	0	0	2
45		SSTK3019	Introduction to Digital Business	2	0	0	1	0	0	1	0	0	2
46		SSTK3021	Statistical Quality Control I	1	0	0.5	0.5	0	0	0	0	0	1
47		SSTK3023	Statistical Quality Control I Practicum	2	0	1	1	0	0	0	0	0	2
48		SSTK3025	Time Series Analysis	1	0	0.5	0.5	0	0	0	0	0	1
49		SSTK3027	Time Series Analysis Practicum	2	0	1	1	0	0	0	0	0	2
50		SSTK3029	Data Mining	1	0	0.5	0.5	0	0	0	0	0	1
51		SSTK3031	Data Mining Practicum	2	1	0	0	0	0	0	1	0	2
52	VI	SSTK3034	Statistical Computation and Simulation	2	0	0	2	0	0	0	0	0	2
53		SSTK3036	Capita Selecta	2	0	0	0	1	0	0	0	1	2
54		SSTK3038	Colloquium	3	0	0	1.5	0	0	1.5	0	0	3

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
55	VII	SMPAP001	Internship	3	0	0	0	1.5	0	0	0	1.5	3
56		MKWUP001	Community Service	2	0	0	0	0	1	0	0	1	2
57		SMPAP002	Research Proposal	2	0	0	0	1	0	0.5	0.5	0	2
58	VIII	SMPAPA01	Final Project	4	0	0	1	2	0	0	0	1	4
59	Elective IV	SSTK6040	Fuzzy System	2	0	0	0	1	0	1	0	0	2
60		SSTK6042	Official Statistics	2	1	0	1	0	0	0	0	0	2
61		SSTK6044	Population Statistics	2	0	0	1	0	0	1	0	0	2
62		SSTK6046	Introduction to Actuarial Science	3	0	1.5	1.5	0	0	0	0	0	3
63		SSTK6048	Operations and Business Management	3	1.5	0	0	0	0	1.5	0	0	3
64		SSTK6050	Advanced calculus	3	0	0	1.5	1.5	0	0	0	0	3
65		SSTK6052	Data Structure	2	0	1	1	0	0	0	0	0	2
66		SSTK6054	Data Structure Practicum	1	0	0.5	0.5	0	0	0	0	0	1
67		SSTK6056	Machine Learning	3	1.5	0	1.5	0	0	0	0	0	3
68		SSTK6058	Machine Learning Practicum	1	0	0.5	0.5	0	0	0	0	0	1
69		SSTK6060	Geographic Information System	2	1	0	1	0	0	0	0	0	2
70		SSTK6062	Geographic Information System Practicum	1	0	0.5	0.5	0	0	0	0	0	1
71		SSTK6064	Management Information System	2	0	0	1	1	0	0	0	0	2
72		SSTK6066	Management Information System Practicum	1	0	0.5	0.5	0	0	0	0	0	1

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
73		SSTK6068	Ekonometrics I	2	0	1	1	0	0	0	0	0	2
74		SSTK6070	Ekonometrics I Practicum	1	0	0.5	0.5	0	0	0	0	0	1
75		SSTK6072	Operations Research I	2	1	0	1	0	0	0	0	0	2
76		SSTK6074	Operations Research I Practicum	1	0	0.5	0.5	0	0	0	0	0	1
77	**Elective V**	SSTK6033	Introduction to Physics Practicum	1	0.5	0	0.5	0	0	0	0	0	1
78		SSTK6035	Introduction to Chemistry Practicum	1	0.5	0	0.5	0	0	0	0	0	1
79		SSTK6037	Introduction to Biology Practicum	1	0.5	0	0.5	0	0	0	0	0	1
80		SSTK6039	Epidemiology	2	0	1	0.5	0.5	0	0	0	0	2
81		SSTK6041	Environmental Health Statistics	2	0	1	0.5	0.5	0	0	0	0	2
82		SSTK6043	Educational Measurement and Evaluation	2	0	1	0	0	0	1	0	0	2
83		SSTK6045	Introduction to Financial Analysis	3	0	1.5	1.5	0	0	0	0	0	3
84		SSTK6047	Financial Analysis	3	0	1	1	1	0	0	0	0	3
85		SSTK6049	Linear Models	3	1	1	1	0	0	0	0	0	3
86		SSTK6051	Experimental Design II	2	0	1	0.5	0.5	0	0	0	0	2
87		SSTK6053	Experimental Design II Practicum	1	0	0.5	0.5	0	0	0	0	0	1
88		SSTK6055	Disaster Statistics	2	0	0	1	0.5	0	0.5	0	0	2
89		SSTK6057	Disaster Statistics Practicum	1	0	0.5	0.5	0	0	0	0	0	1
90		SSTK6059	Spatial Statistics	2	0	0.5	1	0.5	0	0	0	0	2

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
91		SSTK6061	Spatial Statistics Practicum	1	0	0.5	0.5	0	0	0	0	0	1
92		SSTK6063	Econometrics II	2	0	1	0.5	0	0	0.5	0	0	2
93		SSTK6065	Econometrics II Practicum	1	0	0.5	0.5	0	0	0	0	0	1
94		SSTK6067	Operations Research II	2	0	1	1	0	0	0	0	0	2
95		SSTK6069	Operations Research II Practicum	1	0	0.5	0.5	0	0	0	0	0	1
96	**Elective VI**	SSTK6076	Longitudinal Data Analysis	2	0	0.5	0.5	1	0	0	0	0	2
97		SSTK6078	Environmental Statistics	2	0	0.5	0.5	0	0	1	0	0	2
98		SSTK6080	Item Response Theory	2	0	0.5	0.5	0	0	1	0	0	2
99		SSTK6082	Sociometrics	2	0	0	1	1	0	0	0	0	2
100		SSTK6084	Public Policy Analysis	2	0	0	0	1	0	0	0	1	2
101		SSTK6086	Statistical Business and Profession	2	0	0	0	0	0	0.5	1	0.5	2
102		SSTK6088	Forensic Statistics	3	0	0	1	0	0	1	1	0	3
103		SSTK6090	Computational Biostatistics	2	0	0.5	0.5	0	0	1	0	0	2
104		SSTK6092	Computational Biostatistics Practicum	1	0	0.5	0.5	0	0	0	0	0	1
105		SSTK6094	Advanced Numerical Methods	2	0	0	1	0	0	1	0	0	2
106		SSTK6096	Advanced Numerical Methods Practicum	1	0	0.5	0.5	0	0	0	0	0	1
107		SSTK6098	Advanced Nonparametric Statistics	2	0	0.5	1	0	0	0.5	0	0	2
108		SSTK6100	Advanced Nonparametric Statistics	1	0	0.5	0.5	0	0	0	0	0	1

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
			Practicum										
109		SSTK6102	Statistical Quality Control II	2	0	0.5	1	0	0	0.5	0	0	2
110		SSTK6104	Statistical Quality Control II Practicum	1	0	0.5	0.5	0	0	0	0	0	1
111		SSTK6106	Marketing Research	2	0	0.5	1	0	0	0	0.5	0	2
112		SSTK6108	Marketing Research Practicum	1	0	0.5	0.5	0	0	0	0	0	1
113		SSTK6110	Digital Business	2	0	0	0.5	0	0	0	0.5	1	2
114		SSTK6112	Digital Business Practicum	1	0	0.5	0.5	0	0	0	0	0	1
115	**Elective VII**	SSTK6071	Health Data Analysis	2	0	0	0.5	0	0	0	0.5	1	2
116		SSTK6073	Actuarial Science	2	0	0	1	0	0	0.5	0	0.5	2
117		SSTK6075	Advanced Time Series Analysis	2	0	0.5	1	0	0	0.5	0	0	2
118		SSTK6077	Advanced Time Series Analysis Practicum	1	0	0.5	0.5	0	0	0	0	0	1
119		SSTK6079	Meta Analysis	2	0	0	1	0	0	1	0	0	2
120		SSTK6081	Meta Analysis Practicum	1	0	0.5	0.5	0	0	0	0	0	1
121		SSTK6083	Big Data Programming	2	0	0	1	0	0	0.5	0	0.5	2
122		SSTK6085	Big Data Programming Practicum	1	0	0.5	0.5	0	0	0	0	0	1
123		SSTK6087	Business Intelligence and Data Analytics	2	0	0	1	0	0	0.5	0	0.5	2
124		SSTK6089	Business Intelligence and Data Analytics Practicum	1	0	0.5	0.5	0	0	0	0	0	1

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
125		SSTK6091	Text Analysis	2	0	0	1	0	0	0.5	0	0.5	2
126		SSTK6093	Text Analysis Practicum	1	0	0.5	0.5	0	0	0	0	0	1
127		SSTK6095	Artificial Intelligence	2	0	0	1	0	0	0.5	0	0.5	2
128		SSTK6097	Artificial Intelligence Practicum	1	0	0.5	0.5	0	0	0	0	0	1
129		SSTK6099	Structural Equation Modeling	2	0	0.5	1	0	0	0.5	0	0	2
130		SSTK6101	Structural Equation Modeling Practicum	1	0	0.5	0.5	0	0	0	0	0	1
131		SSTK6103	Statistical Modeling	2	0	0.5	1	0	0	0.5	0	0	2
132		SSTK6105	Statistical Modeling Practicum	1	0	0.5	0.5	0	0	0	0	0	1
133		SSTK6107	Survival Analysis	2	0	0.5	1	0	0	0.5	0	0	2
134		SSTK6109	Survival Analysis Practicum	1	0	0.5	0.5	0	0	0	0	0	1
135		SSTK6111	Stochastic Processes	2	0	0	1	0	0	0.5	0	0.5	2
136		SSTK6113	Stochastic Processes Practicum	1	0	0.5	0.5	0	0	0	0	0	1
137		SSTK6015	Advanced Capita Selecta	2	0	0	2	0	0	0	0	0	2
138		SMPAP003	Entrepreneurial Practice	17	0	0	0	0	0	4	9	4	17
139		SMPAP004	Scientific Publication	11	0	3	5	0	0	3	0	0	11
140		SMPAP005	Industrial Internship A	17	0	0	0	0	0	10	3	4	17
141		SMPAP006	Industrial Internship B	11	0	0	0	0	0	8	1	2	11
142		SMPAP007	Village Project A	18	0	0	0	0	0	10	3	5	18
143		SMPAP008	Village Project B	12	0	0	0	0	0	7	2	3	12

No	SMT	CODE	COURSE	Credit Point	ILO*								
					1	2	3	4	5	6	7	8	Total
144		SMPAP009	Science Teaching Practice A	18	0	0	0	0	0	10	3	5	18
145		SMPAP010	Science Teaching Practice B	12	0	0	0	0	0	6	2	4	12
Total Weight of ILO Assessment Samples				363	44	56	93.5	22	12	87.5	37.5	46.5	363
Percentage of ILO Assessment Sample Weights				100.00	12.12	15.43	25.76	6.06	3.31	24.10	10.33	12.81	100.00

Key Points to focus on when measuring the Intended Learning Outcomes (ILO):

1. An ILO can be achieved through several Course Learning Outcomes (CLO) that are distributed across more than one course.
2. The CLO should remain consistent even if the course title changes.
3. The connection between an ILO and courses should not exceed four courses to simplify assessment calculations.
4. The number of CLO per course should not exceed five, although each may be elaborated further with sub-CLOs.
5. The achievement of CLO in a course must be fully represented (100%) across all types of assessments within that course.
6. A student score above 50 can be considered as passing the specific CLO.

Example of a matrix showing course contribution to the ILOs:

Select the courses with the highest relevance (H = High) to the attainment of a specific ILO. Assessment of ILOs can be conducted by using assessment samples from CLOs that contribute to the ILO in question. Each ILO must be measured by at least **three** different courses. An example of how to calculate ILO weight from semesters 1 to 8 is shown in Table 4.3. In that table, ILOs are coded as A, B, C, and so on. The contribution of a course to the ILOs is illustrated using the course Laboratory of Material Analysis (2 credits), which contributes to ILO C and ILO I. Since this course is worth 2 credits, the program team and course instructors determine that 75% (or 1.5 credits) relate to ILO C, and 25% (or 0.5 credits) relate to ILO I. The percentage of assessment for a particular ILO is calculated by

dividing the total weight of the ILO by the total ILO credit weight (e.g., 37). For example, if ILO A has a total of 4.4 credits, then its weight is calculated as (4.4 / 37) × 100% = 12%.

Example of Student ILO Scores
NAME : Mimi Salwana
NPM : 2008108010067

Sem	No	Code	Course	ILO							
				1	2	3	4	5	6	7	8
I	1	SPMA1011	Statistical Methods	80	84	82	0	0	0	0	0
II	2	SSTK1008	Data Exploration and Visualization	0	70	81.5	0	0	0	0	0
	3	SSTK1004	Matrix Algebra	87	0	0	0	0	0	0	0
III	4	SSTK2011	Regression Analysis	82.5	85	84	0	0	0	0	0
IV	5	SSTK2018	Categorical Data Analysis	0	82	81	0	0	0	0	0
V	6	SSTK3029	Data Mining	0	87	75	0	0	0	0	0
	7	SSTK3021	Statistical Quality Control I	0	0	77.8	0	0	82	0	0
	8	SSTK3025	Time Series Analysis	0	82	79.5	0	0	0	0	0
VI	9	SSTK3034	Statistical Computation and Simulation	0	0	83	0	0	85	0	0
	10	SSTK3036	Capita Selecta	0	0	83	0	0	0	0	0
VII	11	MKWUP001	Community Services	0	0	0	0	82.4	0	0	79.5
	12	SPMAP002	Research Proposal	0	0	0	82.2	0	77.5	85	0
VIII	13	SPMAPA01	Final Project	0	0	85.5	79.5	0	0	0	81.3
ILO Score				83.17	81.67	81.23	80.85	82.40	81.50	85.00	80.40

Note: The calculation of the ILO score is based on the weight of the course's ILO contribution relative to the total weight of that ILO.

Example of ILO Transcript in Bachelor in Statistics USK:

INTENDED LEARNING OUTCOME TRANSCRIPT
No. 1646/UN1.1.4/3/KM/2023

Name	: Mimi Salwana	Faculty	: MIPA
NPM	: 2008108010067	Study Program	: Statistika
Place of Birth	: Beureunuen	Level of Study	: Bachelor
Date of Birth	: 4 October 2003	Date of Graduation	: 17 January 2024

No	Code	Learning Outcome	Grade	Criteria
1	CPL-01	Able to understand the basic concepts of calculus, matrices, probability, programming algorithms, and can explain the basic principle of statistics.	83.17	Excellent
2	CPL - 02	Have the ability to use data collection techniques, statistical analysis methods, and data science, and be able to master statistical software in various applied fields.	81.67	Excellent
3	CPL - 03	Skilled in solving real problems simply and practically, able to analyze and interpret data processing results. Ability to use data collection techniques, statistical analysis, and data science and master statistical software in various applied fields.	81.23	Excellent
4	CPL - 04	Able to work and be responsible for the results of independent and group work at local, regional, and global levels.	80.85	Good
5	CPL -05	Be devoted to God Almighty, have noble character, demonstrate character that is in line with the principles of Pancasila, comply with professional ethics, and be responsible in contributing to society.	82.40	Excellent
6	CPL-06	Able to think logically, critically, systematically, and innovatively independently in applying, evaluating, and developing science and technology.	81.50	Excellent
7	CPL-07	Able to demonstrate creative aspects in entrepreneurship by combining and utilizing knowledge from various relevant scientific fields.	85.00	Excellent
8	CPL-08	Able to establish and maintain cooperation networks at regional and global levels, and skilled in operating information and communication technology.	80.40	Good

Description: 81 - 100 : Excellent
61 - 80 : Good
51 - 60 : Fair
< 51 : Poor

Banda Aceh, 21 January 2024
Study Program Coordinator,

Prof. Dr. Zurnila Marli Kesuma, S.Si., M.Si.
NIP. 19690306 199412 2 001

To ensure that every student graduating from a USK Study Program has fulfilled all the established Intended Learning Outcomes (ILOs), the following steps are taken:

1. The Study Program establishes minimum graduation standards for ILOs, ILO achievement targets, and ILO graduation predicates (Excellent, Good, Fair, and Poor).
2. The Study Program monitors students' ILO achievement levels at the end of each academic year and provides recommendations for students whose ILO fulfillment has not met the established targets.
3. The Study Program issues an ILO Transcript in addition to the Academic Transcript for all graduates at the time of graduation.

4.3 Monitoring of Learning Implementation and Evaluation of CLO Achievement

Monitoring of Learning Implementation and Evaluation of Course Learning Outcome (CLO) Achievement is conducted as part of the PDCA (Plan, Do, Check, Act) cycle to ensure the implementation of continuous improvement. The monitoring focuses on the learning content, learning process, assessment methods, and lecturer attendance. Evaluation of CLO achievement emphasizes the pass rate of each CLO, highest and lowest scores, and the average student performance.

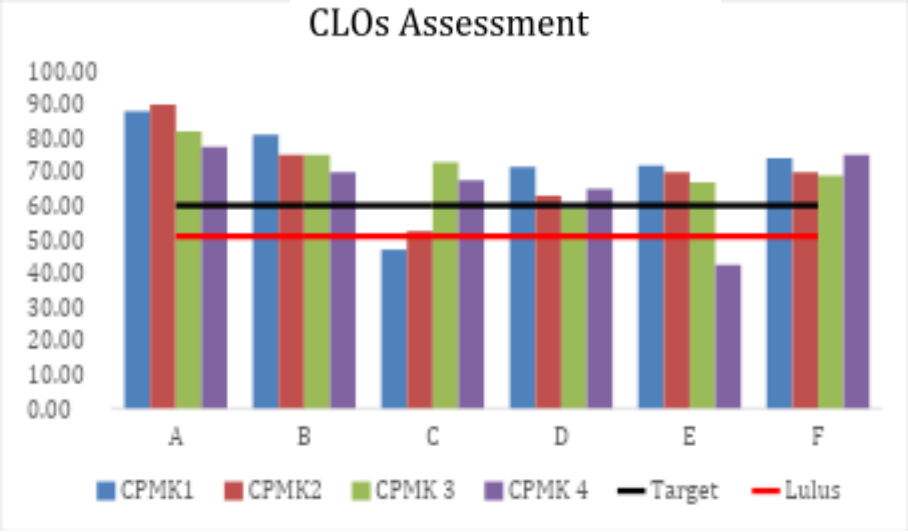
The monitoring and evaluation process is carried out through the following steps:

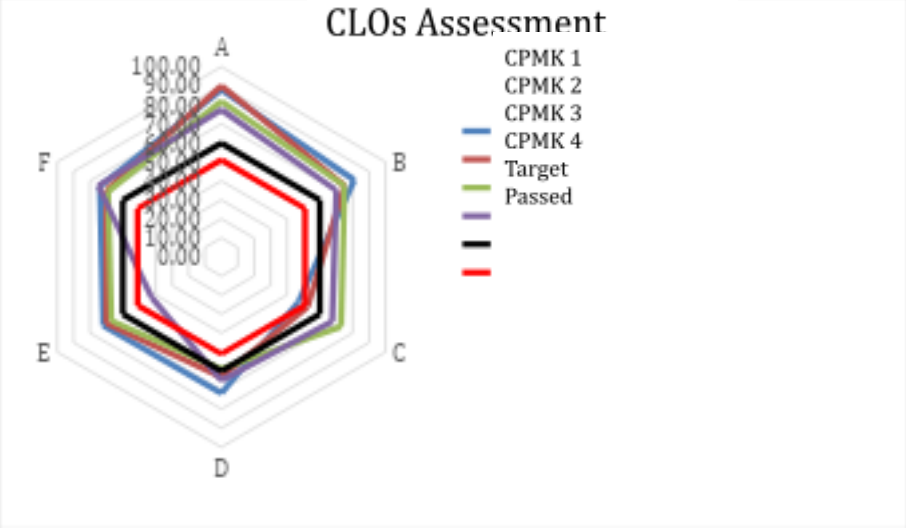
1. Each lecturer is required to prepare a teaching control plan at the beginning of the semester.
2. Each lecturer must take attendance and complete the weekly monitoring sheet for each session.
3. In one semester, lecturers conduct 16 sessions, including the midterm and final examinations.
4. At the end of the semester, students evaluate lecturer performance by completing an online questionnaire.
5. At the end of each semester, lecturers are required to evaluate the learning implementation and CLO achievement by filling out a portfolio provided by the study program. The results are reported to the program for further evaluation.
6. The program coordinator evaluates lecturer attendance, the alignment of the course implementation with the Semester Learning Plan (RPS), and the timeliness of final grade submission.

The following is an example of evaluation and analysis of CLO achievement that can serve as a reference for study programs within Universitas Syiah Kuala.

Evaluation of CLO Achievement:

Student Name	Assessment Item								CLO Grade				ILO Grade			Final Grade	
	Assignment 1	Assignment 2	Quiz 1	Quiz 2	Midterm Exam		Final Exam		CPL-A	CPL-D		CPL-F	CPL-A	CPL-D	CPL-F	Number	Letter
	CPMK1	CPMK2	CPMK 3	CMPK 4	CPMK 1	CPMK 2	CPMK 3	CPMK 4	CPMK 1	CPMK 2	CPMK 3	CPMK 4					
	10%	10%	15%	15%	15%	10%	10%	15%	25.0%	20.0%	25.0%	30.0%	25%	45%	30%	100%	
A	100	90	80	70	80	90	85	85	88.00	90	82	77.5	88.00	85.56	77.5	84	AB
B	90	80	75	80	75	70	75	60	81.00	75	75	70	81.00	75.00	70	75	B
C	50	60	75	80	45	45	70	55	47.00	52.5	73	67.5	47.00	63.89	67.5	61	BC
D	89	56	45	60	60	70	80	70	71.60	63	59	65	71.60	60.78	65	65	BC
E	75	60	75	45	70	80	55	40	72.00	70	67	42.5	72.00	68.33	42.5	62	BC
F	80	60	75	90	70	80	60	60	74.00	70	69	75	74.00	69.44	75	72	B
Average	80.7	67.7	70.8	70.8	66.7	72.5	70.8	61.7	72.3	70.1	70.8	66.3	72.3	70.5	66.3	69.7	





Analysis of CLO Achievement:

- The passing grade for CLO in Course X is set at 51 out of 100, meaning the minimum targeted student understanding is 51% of the total learning outcome. The course instructor targets the average class score for each CLO to be 60 out of 100, or 60% understanding of the intended learning outcome.
- The average CLO scores across all students show values > 60, which is above the target. However, 2 students (approximately 33.33% of the total 6 students) failed to meet the minimum score for certain CLOs, specifically CLO 1 and CLO 4 as shown in the CLO score column.
- The average ILO score across all students also exceeds 60. Nevertheless, 2 students scored below the passing mark for ILOs, specifically for ILO A and ILO F, as indicated in the ILO score column.
- The overall average final score for the students is 69.7.

Follow-up Actions

Based on the learning outcomes achieved, a further evaluation was conducted on the achievement of student learning outcomes. A specific observation was carried out for two students whose CLO scores were still below the minimum target. The observation revealed that both students had low scores in the midterm and final exams. The course coordinator also confirmed the students' class attendance. To meet the established learning outcomes, the main obstacle faced by these students was their lack of preparation for exams involving design and calculation tasks, particularly due to not bringing the thermodynamic tables. As a result, they were unable to complete the exam questions properly

Future Improvement Plan

To maximize the achievement of the intended learning outcomes (ILOs), several strategies will be implemented:

- Paying close attention to each student's condition during online learning. Lecturers are encouraged to provide alternative learning methods as a solution for students facing difficulties in online learning. Additional practice with design and calculation problems will also be provided in the classroom.
- Providing students with the opportunity to take remedial exams if their initial test results fall below the targeted outcomes.

Assessment and evaluation of the ILOs will be conducted by the study program at the end of each academic year to monitor and evaluate the achievement of ILOs for each student cohort. This process will also serve as a basis for continuous improvement of the learning process within the Bachelor's Program in Statistics.