



## Mathematics Study Program

Telp : (0341) 558933

Email : matematika@uin-malang.ac.id

Website : www.matematika.uin-malang.ac.id

## MODULE HANDBOOK

Module name	Metodologi Penelitian <i>Research Methodology</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060111D24
Courses, if applicable	Metodologi Penelitian <i>Research Methodology</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua Konsorsium <i>Chair of Consortium</i>
Lecturers	Tim Konsorsium <i>Consortium Team</i>
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Wajib <i>Compulsory course</i>
Teaching methods	Ceramah, diskusi kelas, presentasi. <i>Lecture, classroom discussion, presentation</i>
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Metodologi Penelitian sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Research Methodology course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Kapita Selektta [sesuai Konsorsium] <i>Selected Topic based on Consortium</i>
Module objectives/intended learning outcomes	Mahasiswa mampu untuk: CO1. menjelaskan dasar-dasar metode penelitian ilmiah. CO2. menjelaskan langkah-langkah penelitian ilmiah.



**UNIVERSITAS ISLAM NEGERI MAULANA MALIK IBRAHIM MALANG**

Faculty of Science and Technology

Mathematics Study Program

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	<p>CO3. membuat rencana penelitian sesuai dengan kaidah ilmiah dan menyajikannya dalam bentuk draf proposal penelitian.</p> <p><i>Students are able to:</i></p> <p>CO1. explain the basics of scientific research methods.</p> <p>CO2. explain the steps of scientific research.</p> <p>CO3. make a research plan in accordance with scientific principles and present it in the form of a draft research proposal.</p>												
Content	<p>Mata kuliah ini membahas:</p> <p>Dasar-dasar metode penelitian ilmiah</p> <p>Langkah-langkah penelitian ilmiah</p> <p>Penyusunan proposal dan penyusunan laporan penelitian serta presentasi dengan didasarkan pada cara berfikir dan kaidah-kaidah ilmiah.</p> <p><i>This course covers:</i></p> <p><i>The fundamentals of scientific research methodologies.</i></p> <p><i>The systematic steps involved in conducting scientific research.</i></p> <p><i>The development of research proposals and the preparation of research reports, along with presentations based on scientific reasoning and established scholarly principles.</i></p>												
Study and examination requirements and forms of examination	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <p><i>The final grade will be weighted as follows:</i></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>No.</th> <th>Metode Evaluasi Assessment Methods</th> <th>Bobot Weight</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Tugas (Assignments)</td> <td>30%</td> </tr> <tr> <td>2</td> <td>Proyek 1 (Project 1)</td> <td>30%</td> </tr> <tr> <td>3</td> <td>Proyek 2 (Project 2)</td> <td>40%</td> </tr> </tbody> </table>	No.	Metode Evaluasi Assessment Methods	Bobot Weight	1	Tugas (Assignments)	30%	2	Proyek 1 (Project 1)	30%	3	Proyek 2 (Project 2)	40%
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Media employed	<i>Whiteboard, Projector, Laptop</i>												
Reading List	-												

**PLO and CO Mapping (The PLO is available on <https://s.id/PLOMatematika>)**

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CO 1											
CO 2											
CO 3											
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Date of Last Amendment:

July 27<sup>th</sup>, 2023



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## MODULE HANDBOOK

Module name	Statistika Elementer <i>Elementary Statistics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060111D11
Courses, if applicable	Statistika Elementer <i>Elementary Statistics</i>
Semester(s) in which the module is taught	3 <sup>rd</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Ria Dhea Layla, N.K., M.Si Angga Dwi Mulyanto, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Wajib <i>Compulsory Course</i>
Teaching methods	Ceramah, diskusi kelas, presentasi, praktikum. <i>Lecture, classroom discussion, presentation, practice</i>
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Statistika Elementer sekurang-kurangnya 80% dari pertemuan. <i>The students have attended the Elementary Statistics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Logika dan Himpunan <i>Logic and Set</i>



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. menjelaskan konsep metode statistik dan menghitung nilai-nilai pusat serta ukuran penyebaran data serta mendeskripsikan informasi dari sekumpulan data.</p> <p>CO2. menjelaskan dan menghitung distribusi probabilitas diskrit dan kontinu serta dapat menggambarkan peristiwa diskrit dan kontinu.</p> <p>CO3. menjelaskan konsep estimasi dan membuat estimasi sesuai dengan peristiwa nyata.</p> <p>CO4. menjelaskan konsep merumuskan hipotesis dan melakukan pengujian hipotesis pada peristiwa nyata.</p> <p>CO5. menjelaskan model regresi linier sederhana, korelasi, dan menginterpretasikan hasilnya, serta dapat menggunakan perangkat lunak statistik.</p> <p><i>Students are able to:</i></p> <p>CO1. explain the concept of statistical methods in general and calculate central values and measures of data spread and describe about dataset.</p> <p>CO2. explain and calculate discrete and continuous probability distributions and can describe discrete and continuous events.</p> <p>CO3. explain the concept of estimation and make estimates according to real events.</p> <p>CO4. explain the concept of formulating a hypothesis and taking hypothesis testing on a real event.</p> <p>CO5. explain simple linear regression model, correlation, interpret the results and use statistical software according to its function.</p>															
<p>Content</p>	<p>Mata kuliah ini membahas:</p> <ul style="list-style-type: none"> <li>▪ Statistika deskriptif</li> <li>▪ Peluang dan distribusi peluang</li> <li>▪ Penaksiran parameter</li> <li>▪ Pengujian hipotesis</li> <li>▪ Korelasi dan regresi linier sederhana</li> </ul> <p><i>The course covers:</i></p> <ul style="list-style-type: none"> <li>▪ Statistics descriptive</li> <li>▪ Probability and Probability distribution</li> <li>▪ Parameter estimation</li> <li>▪ Hypothesis testing</li> <li>▪ Correlation &amp; Simple Linear Regression</li> </ul>															
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Reading List	<ol style="list-style-type: none"><li>1. Walpole, R.E., Myers R. H., Myers S.L. 2011. <i>Probability &amp; Statistics for Engineers &amp; Scientists. (9th Edition)</i>. Pearson Education: Boston, America. 2011.</li><li>2. Bhattacharya, G. and Johnson, R.A. 2002. <i>Statistical Concept and Methods</i>, John Wiley &amp; Sons, New York.</li><li>3. Karisma, Ria Dhea L.K, Modul Ajar Statistika Elementer</li></ol>
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## MODULE HANDBOOK

Module name	Teori Peluang <i>Probability Theory</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060111D12
Courses, if applicable	Teori Peluang <i>Probability Theory</i>
Semester(s) in which the module is taught	4 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Prof. Dr. Sri Harini, M.Si Abdul Aziz, M.Si Dr. Fachrur Rozi, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Wajib <i>Compulsory Course</i>
Teaching methods	Ceramah, Diskusi
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Teori Peluang sekurang-kurangnya 80% dari pertemuan. <i>The students have attended the Probability Theory course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Statistika Elementer, Kalkulus II <i>Elementary Statistics, Calculus II</i>



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. Menentukan peluang dengan menerapkan konsep pencacahan dan hukum-hukum peluang.</p> <p>CO2. Menjelaskan konsep variabel acak: fungsi peluang/distribusi peluang dan fungsi distribusi kumulatif dari variabel acak diskrit dan kontinu.</p> <p>CO3. Menentukan momen dari variabel acak: mean dan variansi serta fungsi pembangkit momen dari variabel acak.</p> <p>CO4. Mengidentifikasi distribusi peluang dari variabel acak diskrit atau kontinu khusus dan menggunakan sifatnya untuk menghitung peluang.</p> <p>CO5. Menentukan fungsi peluang dari distribusi gabungan termasuk fungsi peluang marginal dan bersyarat, kovariansi, dan korelasi.</p> <p><i>Students are able to:</i></p> <p>CO1. <i>determine the probabilities by applying the concepts of counting and probability laws.</i></p> <p>CO2. <i>explain the concept of random variables: probability function and cumulative distribution function of discrete and continuous random variables.</i></p> <p>CO3. <i>determine the moment of random variables: the mean and variance, and moment generating function of random variables.</i></p> <p>CO4. <i>identify an appropriate probability distribution for special discrete or continuous random variables and use its properties to calculate probabilities.</i></p> <p>CO5. <i>determine the probability function for joint distributions including marginal and conditional probability function, covariance, and correlation.</i></p>
<p>Content</p>	<p>Mata kuliah ini membahas:</p> <ul style="list-style-type: none"><li>- Percobaan acak, ruang sampel, kejadian</li><li>- Peluang: konsep peluang, peluang bersyarat, dan kebebasan</li><li>- Peubah acak diskrit dan kontinu: fungsi peluang dan fungsi distribusi kumulatif.</li><li>- Momen dari peubah acak: ekspektasi, variansi, dan fungsi pembangkit momen.</li><li>- distribusi peluang beberapa peubah acak khusus (diskrit dan kontinu)</li><li>- Distribusi peluang gabungan dari peubah acak: distribusi marginal, distribusi bersyarat, kovariansi, korelasi.</li></ul> <p><i>The course covers:</i></p> <ul style="list-style-type: none"><li>- Random experiments, sample space, events</li><li>- Probability: probability concept, conditional probability, and independences</li><li>- Discrete and continuous random variables (r.v.): probability functions and cumulative distribution functions.</li><li>- Moments of random variables: expectation, variance, and moment generating function.</li><li>- Probability distributions of several special r.v. (discrete and continuous)</li><li>- Joint probability distributions of r.v.: marginal distribution, conditional distribution, covariance, correlation.</li></ul>



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Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut: <i>The final grade will be weighted as follows:</i>  <table><thead><tr><th>No.</th><th>Metode Evaluasi <i>Assessment Methods</i></th><th>Bobot <i>Weight</i></th></tr></thead><tbody><tr><td>1</td><td>UAS (<i>Final Exam</i>)</td><td>35%</td></tr><tr><td>2</td><td>UTS (<i>Midterm Exam</i>)</td><td>30%</td></tr><tr><td>3</td><td>Tugas (<i>Assignment</i>)</td><td>25%</td></tr><tr><td>4</td><td>Kuis (<i>Quizzes</i>)</td><td>10%</td></tr></tbody></table>	No.	Metode Evaluasi <i>Assessment Methods</i>	Bobot <i>Weight</i>	1	UAS ( <i>Final Exam</i> )	35%	2	UTS ( <i>Midterm Exam</i> )	30%	3	Tugas ( <i>Assignment</i> )	25%	4	Kuis ( <i>Quizzes</i> )	10%
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Media employed	Whiteboard, Projector, Laptop															
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CO 1			v			v	v				
CO 2			v							v	
CO 3			v			v	v			v	
CO 4						v	v				
CO 5			v			v				v	

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## MODULE HANDBOOK

Module name	Pengantar Statistika Matematika <i>Introduction to Mathematical Statistics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060111D11
Courses, if applicable	Pengantar Statistika Matematika <i>Introduction to Mathematical Statistics</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Prof. Dr. Sri Harini, M.Si Dr. Fachrur Rozi, M.Si Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Wajib <i>Compulsory Course</i>
Teaching methods	Ceramah, diskusi kelas, pemecahan masalah <i>Lecture, classroom discussion, problem solving</i>
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Statistika Matematika (sekurang-kurangnya 80% dari pertemuan).  <i>The students have attended the Introduction to Mathematical Statistics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. menentukan distribusi peluang dari fungsi peubah acak.</p> <p>CO2. mengaplikasikan teori bilangan besar dan <i>Central Limit Theorem</i> mengaproksimasi distribusi dari statistik sampel</p> <p>CO3. mencari penaksir parameter (penaksir titik dan penaksir selang) menggunakan beberapa metode penaksiran parameter.</p> <p>CO4. menjelaskan sifat-sifat dari penaksir parameter.</p> <p>CO5. menerapkan statistik uji yang sesuai untuk melakukan pengujian hipotesis.</p> <p><i>Students are able to:</i></p> <p>CO1. <i>determine the probability distribution of random variable functions.</i></p> <p>CO2. <i>apply large number theory and Central Limit Theorema to approximating the distribution of sample statistics.</i></p> <p>CO3. <i>find parameter estimators (point estimator and interval estimator) using several parameter estimation methods.</i></p> <p>CO4. <i>explain the properties of parameter estimators.</i></p> <p>CO5. <i>apply appropriate test statistics to carry out hypothesis testing.</i></p>															
<p>Content</p>	<p>Mata kuliah ini membahas:</p> <ol style="list-style-type: none"> <li>1. Distribusi dari fungsi peubah acak</li> <li>2. Distribusi statistik sampel: distribusi rata-rata dan variansi sampel</li> <li>3. Distribusi limit dari peubah acak: Pertaksamaan Markov dan Chebyshev, Hukum Bilangan Besar, <i>Central Limit Theorem</i>.</li> <li>4. Penaksiran: penaksir titik dan selang, metode penaksiran, sifat-sifat penaksir.</li> <li>5. Penentuan statistik uji pada pengujian hipotesis.</li> </ol> <p><i>The course will cover about:</i></p> <ol style="list-style-type: none"> <li>1. <i>Distribution of random variable functions</i></li> <li>2. <i>Sample statistical distribution: distribution of sample means and variances</i></li> <li>3. <i>Limit distribution of random variables: Markov and Chebyshev inequality, Law of Large Numbers, Central Limit Theorem.</i></li> <li>4. <i>Estimation: point and interval estimators, estimation methods, properties of estimators.</i></li> <li>5. <i>Determination of test statistics in hypothesis testing.</i></li> </ol>															
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## MODULE HANDBOOK

Module name	Kapita Seleкта Statistik <i>Selected Topics on Statistics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E61
Courses, if applicable	Kapita Seleкта Statistik <i>Selected Topics on Statistics</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Tim Konsorsium <i>Consortium Team</i>
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	Ceramah, diskusi kelas, pemecahan masalah <i>Lecture, classroom discussion, problem solving</i>
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Kapita Seleкта Statistik sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Selected Topics on Statistics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Statistika Elementer, Teori Peluang



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Module objectives/intended learning outcomes	Mahasiswa mampu untuk:  <i>Students are able to:</i>												
Content	<p>Mata kuliah ini membahas mengenai metode-metode statistika yang dapat digunakan dalam penelitian dan sebagai bahan untuk skripsi. Metode yang digunakan mencakup statistika parametrik dan non parametrik. Pada mata kuliah ini mahasiswa dapat menambah wawasan dalam khasanah ilmu statistik. Sehingga nantinya dapat digunakan untuk menganalisis dan mengerjakan tugas akhir serta mempublikasikan penelitian yang telah dilakukan.</p> <p><i>This course discusses statistical methods that can be used in research and as material for theses. The methods used include parametric and non-parametric statistics. In this course students can broaden their insight into the knowledge of statistics. So that later it can be used to analyze and carry out final assignments as well as publish research that has been carried out.</i></p>												
Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut: <table><thead><tr><th>No.</th><th>Metode Penilaian</th><th>Bobot</th></tr></thead><tbody><tr><td>1</td><td>Tugas</td><td>25%</td></tr><tr><td>2</td><td>Presentasi</td><td>30%</td></tr><tr><td>3</td><td>Project</td><td>45%</td></tr></tbody></table>	No.	Metode Penilaian	Bobot	1	Tugas	25%	2	Presentasi	30%	3	Project	45%
No.	Metode Penilaian	Bobot											
1	Tugas	25%											
2	Presentasi	30%											
3	Project	45%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	<ul style="list-style-type: none"><li>- Artikel-artikel Ilmiah terkait topik Statistik</li><li>- Skripsi-skripsi terkait topik Statistik</li><li>- Penelitian terkait topik Statistik</li></ul>												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
CO 1											
CO 2											
CO 3											
CO 4											
CO 5											

Date of Last Amendment:

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## MODULE HANDBOOK

Module name	Metode Survei Sampling <i>Survey Sampling Methods</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E66
Courses, if applicable	Metode Survey Sampling <i>Survey Sampling Methods</i>
Semester(s) in which the module is taught	4 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Ria Dhea Layla N.K., M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Metode Survey Sampling sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Survey Sampling Methods course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Elementary Statistics



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Module objectives/intended learning outcomes	<p>Mahasiswa mampu untuk:</p> <p><i>Students are able to:</i></p> <p>CO1. explain the basic concepts of probability sampling and non-probability sampling.</p> <p>CO2. explain how to carry out the Simple Random Sampling (SAS), the Stratification, Cluster, Cluster and Two-Level Stratification Sampling, the Systematic Sampling methods.</p> <p>CO3. identify the design and the types of sampling used and applied to research cases (<i>mapping sampling</i>)</p>												
Content	This course discusses the different concepts of probability sampling such as simple random sampling, systematic, cluster, stratification and non-probability sampling as well as good and correct sampling techniques.												
Study and examination requirements and forms of examination	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No.	Metode Penilaian	Bobot											
1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	<ol style="list-style-type: none"> <li>Mendenhall W. (2011). Elementary Survey Sampling, 7th ed, Duxbury Press. Boston (Pustaka Utama)</li> <li>Cochran W.G. (1981). Sampling Techniques, John Wiley and Sons. Inc. New York</li> <li>Kalton G. (1983). Introductin to Survey Sampling. Sage Publication. Newbury Park London India</li> </ol>												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
CO 1											
CO 2											
CO 3											

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## MODULE HANDBOOK

Module name	Pengantar Proses Stokastik <i>Introduction to Stochastics Process</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E69
Courses, if applicable	Pengantar Proses Stokastik <i>Introduction to Stochastics Process</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Ria Dhea Layla N.K., M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Pengantar Proses Stokastik sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Introduction to Stochastics Process course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang <i>Probability Theory</i>





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Module objectives/intended learning outcomes	<p>Mahasiswa mampu untuk:</p> <p><i>Students are able to:</i></p> <p>CO1. explain and apply the basic concepts of opportunity and conditional expectations.</p> <p>CO2. explain and apply the moment generating function in studying the principles of decomposition and superposition in Stochastic.</p> <p>CO3. explain discrete and continue Markov Model study uncertainty phenomena in the world of business, management, industry, and technology.</p> <p>CO4. identify space state and parameter space <math>n</math> long run or steady state ability to arrange differential equation for Poisson process.</p>												
Content	The course discusses the basics of stochastic processes, Simple randomwalks, Discrete time Markov Chains (RMWD) and examples of RMWD models, Transient distributions, Limiting Behavior, First Passage Time, Occupancy Times, Continuous Time Markov Chains (RMWK), Homogeneous and Non-homogeneous Poisson Processes, Stillbirth Processes, Queuing Models.												
Study and examination requirements and forms of examination	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No.	Metode Penilaian	Bobot											
1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	<ol style="list-style-type: none"> <li>Ross, Sheldon M. 2007. Introduction to Probability Models; 9th Edition. New York: Academic Press.</li> <li>Syuhada, Khreshna I.A. Materi Kuliah: MA4181 Pengantar Proses Stokastik. Departemen Matematika ITB, Bandung.</li> <li>Taylor, Howard M. dan Samuel Karlin. 1975. A First Course in Stochastic Processes; Second Edition. New York: Academic Press.</li> </ol> <p>Virtamo, J. 38.143 Queueing Theory/ Probability Theory.</p>												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

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CO 1											
CO 2											
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CO 4											

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## MODULE HANDBOOK

Module name	Analisis Regresi Terapan <i>Applied Regression Analysis</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E64
Courses, if applicable	Analisis Regresi Terapan <i>Applied Regression Analysis</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Dr. Fachrur Rozi, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Analisis Regresi Terapan sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Applied Regression Analysis course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Pengantar Statistika Matematika <i>Introduction to Mathematical Statistics</i>





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## MODULE HANDBOOK

Module name	Pengantar Rancangan Percobaan <i>Introduction to Experimental Design</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E67
Courses, if applicable	Pengantar Rancangan Percobaan <i>Introduction to Experimental Design</i>
Semester(s) in which the module is taught	4 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Prof. Dr. Sri Harini, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Pengantar Rancangan Percobaan sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Introduction to Experimental Design course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Statistika Elementer <i>Elementary Statistics</i>



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Module objectives/intended learning outcomes	Mahasiswa mampu untuk:  <i>Students are able to:</i>												
Content	Mata kuliah ini membahas konsep dasar rancangan percobaan, desain rancangan acak factorial, desain rancangan acak nested, desain rancangan acak fraksional, desain rancangan acak blok tak lengkap, analisis Kovarian, metode Taguchi.  <i>The course covers ...</i>												
Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut:  <table><thead><tr><th>No.</th><th>Metode Penilaian</th><th>Bobot</th></tr></thead><tbody><tr><td>1</td><td>UAS</td><td>40%</td></tr><tr><td>2</td><td>UTS</td><td>40%</td></tr><tr><td>3</td><td>Kuis, Tugas</td><td>20%</td></tr></tbody></table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No.	Metode Penilaian	Bobot											
1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	[?]Gunakan style APA												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

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CO 1											
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## MODULE HANDBOOK

Module name	Riset Sosial <i>Social Research</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E70
Courses, if applicable	Riset Sosial <i>Social Research</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Ria Dhea Layla, N.K., M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Riset Sosial sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Social Research course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang <i>Probability Theory</i>
Module objectives/intended learning outcomes	Mahasiswa mampu untuk: CO1. menjelaskan dan menerapkan penelitian sosial yang berkembang seiring berjalannya waktu. CO2. menjelaskan peran statistik dalam ilmu komputasi sosial.



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	<p>CO3. mengeksplorasi dan merumuskan ide-ide penelitian sosial terkini dengan menggunakan metode pengembangan konsep.</p> <p><i>Students are able to:</i>            CO1. explain and apply social research that development by time.            CO2. explain role of statistics in social computational science.            CO3. explore and formulate the latest social research science ideas using the concept development method.</p>												
Content	<p>Mata kuliah ini membahas:</p> <p><i>The course covers:</i></p> <ul style="list-style-type: none"> <li>▪ Ethic of social research</li> <li>▪ Validity and reliability method</li> <li>▪ Probability and Non-Probability Method</li> <li>▪ Data crawling in social media</li> <li>▪ Social Network Analysis</li> <li>▪ Sentiment analysis</li> <li>▪ Some ML methods</li> </ul>												
Study and examination requirements and forms of examination	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No.	Metode Penilaian	Bobot											
1	UAS	40%											
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3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	<ol style="list-style-type: none"> <li>1. Babbie E., The Practice of Social Research, 2014, USA: Cengage Learning</li> <li>2. Tintle, Chance et al. Intoduction to Statistical Investigations, 2016, USA:</li> <li>3. John Willey and Son Williamson, K., Research Methods for Student, academics and professionals, 2002, Australia: Charles Sturt University</li> </ol>												

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CO 1											
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## MODULE HANDBOOK

Module name	Analisis Data Sains <i>Science Data Analysis</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E62
Courses, if applicable	Analisis Data Sains <i>Science Data Analysis</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Angga Dwi Mulyanto, M.Si Ria Dhea Layla, N.K., M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Analisis Data Sains sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Science Data Analysis course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang <i>Probability Theory</i>



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. menjelaskan konsep dasar statistik dan cara menyiapkan data dari data mentah.</p> <p>CO2. menjelaskan konsep statistik deskriptif, tabulasi silang, dan uji independensi.</p> <p>CO3. menerapkan konsep MANOVA (Multivariate Analysis of Variance)</p> <p>CO4. menerapkan konsep analisis diskriminan dan kluster.</p> <p>CO5. menjelaskan konsep dasar analisis regresi dan analisis regresi logistik beserta penggunaannya.</p> <p><i>Students are able to:</i></p> <p>CO1. <i>explains basic statistical concepts and how to prepare data from raw data.</i></p> <p>CO2. <i>explains the concepts of descriptive statistics, cross tabulation, and independence tests.</i></p> <p>CO3. <i>apply the concept of MANOVA (Multivariate Analysis of Variance)</i></p> <p>CO4. <i>apply the concepts of discriminant and cluster analysis.</i></p> <p>CO5. <i>explains the basic concepts of regression analysis and logistic regression analysis and their uses.</i></p>												
<p>Content</p>	<p>Mata kuliah ini membahas: konsep dasar statistik dan menyiapkan sebuah data, cara menganalisis baik itu dengan staistika deskriptif dan inferensia seperti MANOVA, analisis diskriminan, analisis kluster, analisis regresi, analisis regresi logistik serta dapat menjelaskan makna serta menarik kesimpulan dari analisis yang digunakan.</p> <p><i>The course covers:</i></p> <p><i>This course discusses: basic concepts of statistics and preparing data, how to analyze both descriptive statistics and inference such as MANOVA, discriminant analysis, cluster analysis, regression analysis, logistic regression analysis and can explain the meaning and draw conclusions from the analysis used.</i></p>												
<p>Study and examination requirements and forms of examination</p>	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1" data-bbox="486 1411 1037 1556"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No.	Metode Penilaian	Bobot											
1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
<p>Media employed</p>	<p>Whiteboard, Projector, Laptop</p>												
<p>Reading List</p>	<ol style="list-style-type: none"> <li>Hair, J.F., R.E. Anderson, R.L. Tatham., dan W.C. Black (1995). Multivariate Data Analysis with Readings, 4<sup>th</sup> edition. Englewood Cliffs, NJ: Prentice Hall</li> <li>Johnson, R. A. Dan Wichern, D. W., 2007, Applied Multivariate Statistical Analysis, 6th edition. New Jersey: Printice Hall</li> <li>Drapper, N.R. dan Smith.H. (1996). Applied Regression Analysis 2nd edition. New York: John Wiley &amp; Sons, Chapman and Hall.</li> <li>Jurnal-jurnal metode <i>machine learning</i> terbaru dalam 5 tahun terakhir</li> </ol>												

PLO and CO Mapping (The PLO is available on <https://s.id/PLOMatematika>)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
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**UNIVERSITAS ISLAM NEGERI MAULANA MALIK IBRAHIM MALANG**

Faculty of Science and Technology

Mathematics Study Program

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CO 1												
CO 2												
CO 3												
CO 4												
CO 5												

Date of Last Amendment:

July 27<sup>th</sup>, 2023



## Mathematics Study Program

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## MODULE HANDBOOK

Module name	Time Series
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E71
Courses, if applicable	Time Series
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Prof. Dr. Sri Harini, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Time Series sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Time Series course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Pengantar Statistika Matematika <i>Introduction to Mathematical Statistics</i>
Module objectives/intended learning outcomes	Mahasiswa mampu:  <i>Students are able to:</i>



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Content	Konsep dasar analisis deret waktu dengan pendekatan waktu, Model trend deterministik (metode pemulusan), Model trend stokastik (ARMA, ARIMA dan ARIMA musiman)												
Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut: <table><thead><tr><th>No.</th><th>Metode Penilaian</th><th>Bobot</th></tr></thead><tbody><tr><td>1</td><td>UAS</td><td>40%</td></tr><tr><td>2</td><td>UTS</td><td>40%</td></tr><tr><td>3</td><td>Kuis, Tugas</td><td>20%</td></tr></tbody></table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No.	Metode Penilaian	Bobot											
1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	[?]Gunakan style APA												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

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CO 2											
CO 3											
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CO 5											

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## MODULE HANDBOOK

Module name	Analisis Multivariat <i>Multivariate Analysis</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E63
Courses, if applicable	Analisis Multivariat <i>Multivariate Analysis</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Ria Dhea Layla, N.K., M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Analisis Multivariat sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Multivariate Analysis course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Pengantar Statistika Matematika <i>Introduction to Mathematical Statistics</i>
Module objectives/intended learning outcomes	Mahasiswa mampu: CO1. menjelaskan pengetahuan umum tentang model multivariat. CO2. membuat keputusan tentang asumsi model multivariat dan memperkirakan parameter.





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Date of Last Amendment:
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## MODULE HANDBOOK

Module name	Pengendalian Kualitas Statistik <i>Statistical Quality Control</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E68
Courses, if applicable	Pengendalian Kualitas Statistik <i>Statistical Quality Control</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Dr. Fachrur Rozi, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Pengendalian Kualitas Statistik sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Statistical Quality Control course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Pengantar Statistika Matematika <i>Introduction to Mathematical Statistics</i>
Module objectives/intended learning outcomes	Mahasiswa mampu untuk: CO1. menjelaskan konsep dasar kualitas CO2. menjelaskan penggunaan metode statistika dalam pengendalian kualitas



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	<p>CO3. membuat dan menyusun desain berbagai macam grafik pengendali dan menginterpretasikannya.</p> <p>CO4. menentukan kapabilitas dari suatu proses produksi.</p> <p>CO5. menyusun desain sampling penerimaan dengan tingkat kesalahan yang telah ditentukan.</p> <p><i>Students are able to:</i></p>															
Content	<p>Mata kuliah ini membahas tentang pengendalian kualitas menggunakan pendekatan statistika, yang meliputi materi pengertian kualitas, metode jaminan kualitas, distribusi probabilitas, beberapa distribusi diskrit dan kontinu yang penting pada jaminan kualitas, pengertian dan jenis-jenis distribusi sampling, pengertian analisis pola grafik kendali, sebab-sebab variabilitas kualitas, pemilihan batas-batas kendali, grafik pengendali untuk atribut dan variabel, fungsi karakteristik operasi, kapabilitas proses, grafik pengendali multivariat.</p> <p><i>The course covers:</i></p>															
Study and examination requirements and forms of examination	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Tugas, Kuis</td> <td>20%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>25%</td> </tr> <tr> <td>3</td> <td>UAS</td> <td>30%</td> </tr> <tr> <td>4</td> <td>Project</td> <td>25%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	Tugas, Kuis	20%	2	UTS	25%	3	UAS	30%	4	Project	25%
No.	Metode Penilaian	Bobot														
1	Tugas, Kuis	20%														
2	UTS	25%														
3	UAS	30%														
4	Project	25%														
Media employed	Whiteboard, Projector, Laptop															
Reading List	<ol style="list-style-type: none"> <li>Montgomery, D.C. 2013, Introduction to Statistical Quality Control, 7th Edition, John Wiley &amp; Sons, Inc., USA</li> <li>Besterfield, D.H. 2012. Quality Improvement, 9th Edition, Prentice Hall, USA.</li> </ol>															

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

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### MODULE HANDBOOK

Module name	Komputasi Statistik <i>Statistical Computing</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E65
Courses, if applicable	Komputasi Statistik <i>Statistical Computing</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Angga Dwi Mulyanto, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Komputasi Statistik sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Statistical Computing course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang <i>Probability Theory</i>
Module objectives/intended learning outcomes	Mahasiswa mampu untuk: CO1. melakukan instalasi dan mengenal fitur software R-Studio serta menggunakan bahasa pemrograman R tingkat dasar. CO2. mengelola data menggunakan R. CO3. membuat grafik dengan menggunakan R.



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	CO4. melakukan analisis statistik inferensia menggunakan R. CO5. membuat hasil analisis secara dinamik menggunakan R- <i>markdown</i> . <i>Students are able to:</i>												
Content	Mata kuliah ini membahas: bahasa pemrograman yang digunakan untuk analisis data yaitu R pada tingkat dasar, serta mampu melakukan analisis- analisis statistika standar dengan R. <i>The course covers:</i>												
Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut: <table border="1"> <thead> <tr> <th>No</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
No	Metode Penilaian	Bobot											
1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	1. Rstudio. Rstudio Cheatsheet ( <a href="https://www.rstudio.com/resources/cheatsheets/">https://www.rstudio.com/resources/cheatsheets/</a> ) 2. Chang, Winston. 2013. R Graphics Cookbook for R. ( <a href="http://www.cookbook-r.com/">http://www.cookbook-r.com/</a> ) 3. Zulhanif. 2018. Dasar-Dasar R ( <i>Online Book</i> ) - ( <a href="https://rstudio-pubs-static.s3.amazonaws.com/398904_5b7eb0646b8d4bcda344351a49501a5d.html">https://rstudio-pubs-static.s3.amazonaws.com/398904_5b7eb0646b8d4bcda344351a49501a5d.html</a> )												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

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## MODULE HANDBOOK

Module name	Kapita Selektta Aktuaria <i>Selected Topics on Actuarial</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E72
Courses, if applicable	Kapita Selektta Aktuaria <i>Selected Topics on Actuarial</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Kapita Selektta Aktuaria sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Selected Topics on Actuarial course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang, <b>Matematika Keuangan, Matematika Aktuaria</b> <i>Probability Theory</i>



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Module objectives/intended learning outcomes	Mahasiswa mampu untuk:  <i>Students are able to:</i>												
Content	Mata kuliah ini membahas hal-hal terkini atau terbaru terkait dengan aktuaria yang tidak terdapat pada mata kuliah pilihan atuaria lainnya.  <i>The course covers:</i>												
Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut:												
	<table border="1"><thead><tr><th>No.</th><th>Metode Penilaian</th><th>Bobot</th></tr></thead><tbody><tr><td>1</td><td>UAS</td><td>40%</td></tr><tr><td>2</td><td>UTS</td><td>40%</td></tr><tr><td>3</td><td>Kuis, Tugas</td><td>20%</td></tr></tbody></table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
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Media employed	Whiteboard, Projector, Laptop												
Reading List													

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## MODULE HANDBOOK

Module name	Matematika Ekonomi <i>Economical Mathematics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E76
Courses, if applicable	Matematika Ekonomi <i>Economical Mathematics</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Matematika Ekonomi sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Economical Mathematics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Kalkulus II, Matematika Diskrit <i>Calculus II, Discrete Mathematics</i>



# UNIVERSITAS ISLAM NEGERI MAULANA MALIK IBRAHIM MALANG

Faculty of Science and Technology

Mathematics Study Program

Jl. Gajayana No. 50 Malang 65144 Telp. / Fax. (0341) 558933, website : [www.matematika.uin-malang.ac.id](http://www.matematika.uin-malang.ac.id), e-mail : [matematika@uin-malang.ac.id](mailto:matematika@uin-malang.ac.id)

Module objectives/intended learning outcomes	Mahasiswa mampu untuk:  <i>Students are able to:</i>												
Content	Mata kuliah ini membahas salah satu alat untuk memecahkan masalah ekonomi secara kuantitatif dengan pendekatan matematis.  <i>The course covers:</i>												
Study and examination requirements and forms of examination	Nilai akhir akan diberi bobot sebagai berikut: <table border="1"><thead><tr><th>No.</th><th>Metode Penilaian</th><th>Bobot</th></tr></thead><tbody><tr><td>1</td><td>UAS</td><td>40%</td></tr><tr><td>2</td><td>UTS</td><td>40%</td></tr><tr><td>3</td><td>Kuis, Tugas</td><td>20%</td></tr></tbody></table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
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1	UAS	40%											
2	UTS	40%											
3	Kuis, Tugas	20%											
Media employed	Whiteboard, Projector, Laptop												
Reading List	1. Edward T. Bowling, 1980. Matematika Untuk Ekonomi, Jakarta: Erlangga. 2. Dumairy, 1999. Matematika Yerapan Untuk Bisnis dan Ekonomi, Edisi Kedua, Yogyakarta: BPF.												

**PLO and CO Mapping** (The PLO is available on <https://s.id/PLOMatematika>)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
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Date of Last Amendment:

July 27<sup>th</sup>, 2023





## Mathematics Study Program

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## MODULE HANDBOOK

Module name	Matematika Keuangan <i>Financial Mathematics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E77
Courses, if applicable	Matematika Keuangan <i>Financial Mathematics</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Matematika Keuangan sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Economical Mathematics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Kalkulus I, Teori Peluang <i>Calculus I, Probability Theory</i>



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. Menentukan konsep keuangan instrumen keuangan seperti saham, obligasi, derivatif, dan metode penilaiannya</p> <p>CO2. Identifikasi pemodelan matematika untuk mengembangkan kemahiran terutama menggunakan model matematika untuk menganalisis pasar keuangan, termasuk nilai waktu uang, suku bunga, dan penilaian risiko</p> <p>CO3. Memahami prinsip di balik model penetapan harga opsi, seperti model Black-Scholes, dan penerapannya dalam menilai opsi dan derivatif lainnya.</p> <p>CO4. Memahami dalam menggunakan alat komputasi dan perangkat lunak untuk analisis keuangan, pemodelan, dan simulasi</p> <p><i>Students are able to:</i></p> <p>CO1. Determine Financial concepts of financial instruments, such as stocks, bonds, derivatives, and their valuation methods</p> <p>CO2. Identify Mathematical modeling for develop proficiency especially using mathematical models to analyze financial markets, including time value of money, interest rates, and risk assessment</p> <p>CO3. Understand the principles behind option pricing models, such as the Black-Scholes model, and their applications in valuing options and other derivatives.</p> <p>CO4. Determine proficiency in using computational tools and software for financial analysis, modeling, and simulation</p>												
<p>Content</p>	<p>Mata kuliah ini membahas:</p> <ol style="list-style-type: none"> <li>1. Bunga/<i>Interest</i></li> <li>2. Anuitas</li> <li>3. Metode Pembayaran Hutang (Amortisasi, Sinking Fund)</li> <li>4. Yield rates.</li> <li>5. Perhitungan Harga Saham</li> <li>6. Perhitungan Harga Opsi</li> <li>7. Binomial Model</li> <li>8. Black-Scholes Formula</li> </ol> <p><i>The course covers:</i></p>												
<p>Study and examination requirements and forms of examination</p>	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1" data-bbox="475 1641 1458 1812"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
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<p>Media employed</p>	<p>Whiteboard, Projector, Laptop</p>												
<p>Reading List</p>	<p>1. Aziz, Abdul, (2014). <i>Analisis metode binomial dipercepat pada perhitungan harga opsi Eropa</i>. Malang: Jurnal Cauchy Jurusan Matematika Fak. Saintek UIN Maulana Malik Ibrahim.</p>												



2. Aziz, Abdul, (2009). *Empat Model Aproksimasi Binomial Harga Saham Model Black-Scholes*. Malang: Jurnal Cauchy Jurusan Matematika Fak. Saintek UIN Maulana Malik Ibrahim.
3. Ross, Sheldon M., (1999). *An Introduction to Mathematical Finance, Option and Other Topics*, Cambridge University Press.
4. Wilmott, Paul, (1995). *The Mathematical of Financial Derivatives, A Student Introduction*, Cambridge University Press.
5. Stampfli, J., Goodman, V., (2001). *The Mathematics of Finance*, Brooks/Cole, USA.
6. Higham, Desmond, J., (2004). *Black-Scholes Option Valuation for Scientific Computing Students*, University of Strathclyde Mathematics Research Report 01.
7. Hull, John C., (2003). *Options, Futures, and Other Derivatives*, Prentice Hall, New Jersey, fifth ed.
8. Figlewski, Stephen, (1990). *Theoretical Valuation Models, dalam: Financial Options From Theory To Practice*, Salomon Brothers Center for the Study of Financial Institutions, New York University.
9. Alfinnikmah, Alfu (2020) [Metode tian tree dalam penentuan nilai opsi vanilla tipe eropa.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
10. Dewi, Nur Cholis Santiya (2020) [Metode Monte Carlo Antithetic Variate dalam penentuan nilai opsi Double Barrier.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
11. Hadi, Hadi (2020) [Metode Split Tree dalam penentuan nilai opsi Vanilla tipe Eropa.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
12. Maulida, Intan Fara (2020) [Metode monte carlo control variate dalam penentuan nilai opsi double barrier.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
13. Anwari, Ahmad Mumtaz (2020) [Metode stair tree dalam penentuan nilai opsi vanilla tipe Eropa dengan pembayaran dividen.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
14. Praminia, Diah (2015) [Analisis metode beda hingga Crank-Nicholson dengan transformasi peubah pada perhitungan harga opsi Asia.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
15. Apriliani, Winda (2015) [Analisis metode beda hingga implisit dan eksplisit dengan transformasi peubah pada perhitungan harga opsi Asia.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
16. Zachiroh, Azmil (2015) [Algoritma Forward-Backward dalam Hidden Markov model untuk menganalisis tren pasar saham di Bursa Efek: Studi kasus pada PT Astra Agro Lestari, Tbk.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
17. Istiqomah, Istiqomah (2014) [Analisis metode binomial dipercepat pada perhitungan harga opsi Eropa.](#) Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.



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	<p>18. Wahyudi, Wahyudi (2014) <u><a href="#">Analisis metode beda hingga implisit, eksplisit, dan Crank-Nicholson pada perhitungan harga opsi Asia</a></u>. Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p> <p>19. Cahyaningtyas, Mahatva (2014) <u><a href="#">Metode binomial untuk perhitungan harga opsi Eropa dan opsi Asia Eropa</a></u>. Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p> <p>20. Munawaroh, Siti (2010) <u><a href="#">Analisis model arima Box-jenkins pada data fluktuasi harga emas</a></u>. Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p> <p>21. Muniroh, Wiwik Shofiyatul (2008) <u><a href="#">Simulasi Monte Carlo dalam menentukan nilai opsi saham</a></u>. Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p>
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## PLO and CO Mapping (The PLO is available on <https://s.id/PLOMatematika>)

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## MODULE HANDBOOK

Module name	Ekonometri <i>Econometrics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E74
Courses, if applicable	Ekonometri <i>Econometrics</i>
Semester(s) in which the module is taught	4 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Ekonometri sekurang-kurangnya 80% dari pertemuan. <i>The students have attended the Econometrics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Kalkulus II, Aljabar Linier Elementer, Statistika Elementer, Pemrograman Komputer. <i>Calculus II, Elementary Linear Algebra, Elementary Statistics, Computer Programming.</i>



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. menerapkan teknik ekonometrik pada data ekonomi dunia nyata dan pertanyaan penelitian empiris, menunjukkan kemampuan untuk melakukan analisis empiris independen dan menarik kesimpulan yang bermakna</p> <p>CO2. menerapkan model ekonometrik untuk menganalisis hubungan ekonomi dan menguji hipotesis, dengan mempertimbangkan masalah seperti multikolinearitas, heteroskedastisitas, dan autokorelasi.</p> <p>CO3. menjelaskan pengumpulan, mengelola, dan menyiapkan data untuk analisis ekonometrik, termasuk menangani data yang hilang, outlier, dan transformasi data</p> <p>CO4. menerapkan teknik ekonometrik pada data ekonomi dunia nyata dan pertanyaan penelitian empiris, menunjukkan kemampuan untuk melakukan analisis empiris independen dan menarik kesimpulan yang bermakna</p> <p><i>Students are able to:</i></p> <p>CO1. Define a solid grasp of econometric theory, including the assumptions, limitations, and implications of various econometric models and techniques</p> <p>CO2. Apply econometric models for analyzing economic relationships and testing hypotheses, taking into account issues such as multicollinearity, heteroscedasticity, and autocorrelation.</p> <p>CO3. Acquire skills in collecting, managing, and preparing data for econometric analysis, including dealing with missing data, outliers, and data transformations</p> <p>CO4. Apply econometric techniques to real-world economic data and empirical research questions, demonstrating the ability to conduct independent empirical analysis and draw meaningful conclusions.</p>												
<p>Content</p>	<p>Mata kuliah ini membahas fenomena ekonomi dalam bentuk angka. Analisis di dalam ekonometrika menggabungkan antara teori ekonomi, matematika, dan statistika ke dalam satu sistem analisis yang lengkap.</p> <p><i>The course covers:</i></p>												
<p>Study and examination requirements and forms of examination</p>	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1" data-bbox="472 1626 1460 1798"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
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<p>Media employed</p>	<p>Whiteboard, Projector, Laptop</p>												
<p>Reading List</p>	<p>Aziz, Abdul. 2006. Ekonometri: Analisis Teori dan Praktikum Menggunakan Matlab. UIN Malang Press.</p>												



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## MODULE HANDBOOK

Module name	Matematika Asuransi dan Industri <i>Insurance and Industrial Mathematics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E75
Courses, if applicable	Matematika Asuransi dan Industri <i>Insurance and Industrial Mathematics</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Matematika Asuransi dan Industri sekurang-kurangnya 80% dari pertemuan. <i>The students have attended the Insurance and Industrial Mathematics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	Teori Peluang, Matematika Ekonomi <i>Probability Theory, Economical Mathematics</i>





<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. Mahasiswa mampu dan terampil melakukan perhitungan anuitas, nilai tunai, dan nilai total.</p> <p>CO2. Mahasiswa mampu dan terampil menentukan distribusi peubah acak sisa umur hidup manusia, The Force of Mortality, Survival Function, Bernoulli dan Gompertz Experiment dan Fractional Age Assumption.</p> <p>CO3. Mahasiswa mampu menjelaskan konsep dan perhitungan jenis-jenis asuransi jiwa.</p> <p>CO4. Mahasiswa mampu dan terampil menentukan nilai premi, benefit, dan cadangan premi.</p> <p><i>Students are able to:</i></p> <p>CO1. <i>Apply annuity, cash value and total value calculations</i></p> <p>CO2. <i>Determining the distribution of random variables remaining human life span, The Force of Mortality, Survival Function, Bernoulli and Gompertz Experiment and Fractional Age Assumption</i></p> <p>CO3. <i>Able to explain the concepts and calculations of types of life insurance.</i></p> <p>CO4. <i>Skilled in determining premium values, benefits and premium reserves</i></p>												
<p>Content</p>	<p>Mata kuliah ini membahas: bermacam jenis anuitas hidup dan asuransi, dan selanjutnya menghitung premi dari bermacam-macam jenis asuransi.</p> <p><i>The course covers: various types of life annuities and insurance, and then calculates premiums for various types of insurance.</i></p>												
<p>Study and examination requirements and forms of examination</p>	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1" data-bbox="491 1285 1158 1458"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
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<p>Reading List</p>	<ol style="list-style-type: none"> <li>1. Bowers, Newton, JR. 1997. Actuarial Mathematics. The Society of Actuaries.</li> <li>2. Futami, Takashi. 1993. Matematika Asuransi Jiwa Bagian I. Japan: OLICD Center.</li> <li>3. Gerber, Hans, U. 1997. Life Insurance Mathematics Third Edition, New York: Springer-Veerlag.</li> <li>4. Herliyanto, Gatot. 1998. Matematika Asuransi Jiwa. Bandung: ITB Press.</li> <li>5. Wallace Jordan, Chester, Jr. 1991. Life Contingencies. The Society of Actuaries.</li> <li>6. KH. Ali Yafie, 1994. Asuransi dalam Pandangan Syariat Islam, Menggagas Fiqih Sosial, Bandung: Mizan.</li> <li>7. Ir. Muhammad Syakir Sula, AAIJ, FIIS, 2004, Asuransi Syariah, Jakarta: Gema Insani.</li> </ol>												



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## MODULE HANDBOOK

Module name	Matematika Aktuaria <i>Actuarial Mathematics</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E73
Courses, if applicable	Matematika Aktuaria <i>Actuarial Mathematics</i>
Semester(s) in which the module is taught	5 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M,Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Matematika Aktuaria sekurang-kurangnya 80% dari pertemuan. <i>The students have attended the Actuarial Mathematics course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	



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<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. mengembangkan pemahaman yang kuat tentang konsep dan prinsip dasar matematika aktuaria, termasuk teori probabilitas, statistik matematika, dan matematika keuangan</p> <p>CO2. mengaplikasikan dalam menilai dan mengelola berbagai jenis risiko, termasuk risiko asuransi, risiko keuangan, dan risiko operasional, dengan menggunakan model dan teknik matematika</p> <p>CO3. menganalisis produk asuransi, penetapan harga, dan pemesanan, termasuk teknik seperti pemodelan mortalitas dan morbiditas, perhitungan premi, dan pemesanan klaim.</p> <p><i>Students are able to:</i></p> <p>CO1. <i>Develop a strong understanding of the fundamental concepts and principles of actuarial mathematics, including probability theory, mathematical statistics, and financial mathematics</i></p> <p>CO2. <i>Apply to assess and manage various types of risks, including insurance risk, financial risk, and operational risk, using mathematical models and techniques.</i></p> <p>CO3. <i>Analyze insurance products, pricing, and reserving, including techniques such as mortality and morbidity modeling, premium calculation, and claims reserving.</i></p>												
<p>Content</p>	<p>Mata kuliah ini membahas: Probabilitas dan Statistika, Matematika finansial, Matematika asuransi jiwa, Pensiun dan tunjangan pensiun, Asuransi umum, Manajemen resiko</p> <p><i>The course covers: Probability and Statistics, Financial mathematics, Life insurance mathematics, Pensions and retirement benefits, General insurance, Risk management</i></p>												
<p>Study and examination requirements and forms of examination</p>	<p>Nilai akhir akan diberi bobot sebagai berikut:</p> <table border="1" data-bbox="475 1406 1460 1579"> <thead> <tr> <th>No.</th> <th>Metode Penilaian</th> <th>Bobot</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UAS</td> <td>40%</td> </tr> <tr> <td>2</td> <td>UTS</td> <td>40%</td> </tr> <tr> <td>3</td> <td>Kuis, Tugas</td> <td>20%</td> </tr> </tbody> </table>	No.	Metode Penilaian	Bobot	1	UAS	40%	2	UTS	40%	3	Kuis, Tugas	20%
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<p>Media employed</p>	<p>Whiteboard, Projector, Laptop</p>												
<p>Reading List</p>	<p>1. Aziz, Abdul, (2014). <i>Analisis metode binomial dipercepat pada perhitungan harga opsi Eropa</i>. Malang: Jurnal Cauchy Jurusan Matematika Fak. Saintek UIN Maulana Malik Ibrahim.</p>												



2. Aziz, Abdul, (2009). [Empat Model Aproksimasi Binomial Harga Saham Model Black-Scholes](#). Malang: Jurnal Cauchy Jurusan Matematika Fak. Saintek UIN Maulana Malik Ibrahim.
3. Ross, Sheldon M., (1999). *An Introduction to Mathematical Finance, Option and Other Topics*, Cambridge University Press.
4. Wilmott, Paul, (1995). *The Mathematical of Financial Derivatives, A Student Introduction*, Cambridge University Press.
5. Stampfli, J., Goodman, V., (2001). *The Mathematics of Finance*, Brooks/Cole, USA.
6. Higham, Desmond, J., (2004). *Black-Scholes Option Valuation for Scientific Computing Students*, University of Strathclyde Mathematics Research Report 01.
7. Hull, John C., (2003). *Options, Futures, and Other Derivatives*, Prentice Hall, New Jersey, fifth ed.
8. Figlewski, Stephen, (1990). *Theoretical Valuation Models, dalam: Financial Options From Theory To Practice*, Salomon Brothers Center for the Study of Financial Institutions, New York University.
9. Alfinnikmah, Alfu (2020) [Metode tian tree dalam penentuan nilai opsi vanilla tipe eropa](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
10. Dewi, Nur Cholis Santiya (2020) [Metode Monte Carlo Antithetic Variate dalam penentuan nilai opsi Double Barrier](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
11. Hadi, Hadi (2020) [Metode Split Tree dalam penentuan nilai opsi Vanilla tipe Eropa](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
12. Maulida, Intan Fara (2020) [Metode monte carlo control variate dalam penentuan nilai opsi double barrier](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
13. Anwari, Ahmad Mumtaz (2020) [Metode stair tree dalam penentuan nilai opsi vanilla tipe Eropa dengan pembayaran dividen](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
14. Praminia, Diah (2015) [Analisis metode beda hingga Crank-Nicholson dengan transformasi peubah pada perhitungan harga opsi Asia](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
15. Apriliani, Winda (2015) [Analisis metode beda hingga implisit dan eksplisit dengan transformasi peubah pada perhitungan harga opsi Asia](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
16. Zachiroh, Azmil (2015) [Algoritma Forward-Backward dalam Hidden Markov model untuk menganalisis tren sasaran saham di Bursa Efek: Studi kasus pada PT Astra Agro Lestari, Tbk](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.
17. Istiqomah, Istiqomah (2014) [Analisis metode binomial dipercepat pada perhitungan harga opsi Eropa](#). Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.



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	<p>18. Wahyudi, Wahyudi (2014) <a href="#"><u>Analisis metode beda hingga implisit, eksplisit, dan Crank-Nicholson pada perhitungan harga opsi Asia.</u></a> Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p> <p>19. Cahyaningtyas, Mahatva (2014) <a href="#"><u>Metode binomial untuk perhitungan harga opsi Eropa dan opsi Asia Eropa.</u></a> Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p> <p>20. Munawaroh, Siti (2010) <a href="#"><u>Analisis model arima Box-jenkins pada data fluktuasi harga emas.</u></a> Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p> <p>21. Muniroh, Wiwik Shofiyatul (2008) <a href="#"><u>Simulasi Monte Carlo dalam menentukan nilai opsi saham.</u></a> Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim.</p>
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## PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1						
CO 2						
CO 3						

Date of Last Amendment:

July 27<sup>th</sup>, 2023



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## MODULE HANDBOOK

Module name	Pengantar Teori Risiko <i>Introduction to Risk Theory</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E79
Courses, if applicable	Pengantar Teori Risiko <i>Introduction to Risk Theory</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
Language	Bahasa Indonesia <i>Indonesian</i>
Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
Teaching methods	
Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Pengantar Teori Risiko sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Introduction to Risk Theory course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	



<p>Module objectives/intended learning outcomes</p>	<p>Mahasiswa mampu untuk:</p> <p>CO1. mengembangkan pemahaman yang kuat tentang konsep dasar risiko, termasuk berbagai jenis risiko (misalnya, risiko asuransi, risiko keuangan, risiko operasional), pengukuran risiko, dan strategi manajemen risiko.</p> <p>CO2. menerapkan teori probabilitas untuk memodelkan dan menganalisis peristiwa dan hasil yang tidak pasti, termasuk penggunaan distribusi probabilitas, probabilitas bersyarat, dan proses stokastik</p> <p>CO3. menganalisis distribusi kerugian yang timbul dari peristiwa acak, seperti klaim asuransi, kerugian finansial, dan kegagalan operasional, menggunakan distribusi probabilitas dan teknik statistik</p> <p>CO4. menghitung asuransi, termasuk konsep premi murni, pembebanan, dan margin risiko, serta mempelajari cara menghitung premi asuransi menggunakan model risiko dasar.</p> <p><i>Students are able to:</i></p> <p>CO1. Develop a solid understanding of the fundamental concepts of risk, including different types of risk (e.g., insurance risk, financial risk, operational risk), risk measurement, and risk management strategies.</p> <p>CO2. Applying probability theory to model and analyze uncertain events and outcomes, including the use of probability distributions, conditional probability, and stochastic processes.</p> <p>CO3. Analyze loss distributions arising from random events, such as insurance claims, financial losses, and operational failures, using probability distributions and statistical techniques.</p> <p>CO4. Calculate insurance, including the concepts of pure premium, loading, and risk margin, and learn how to calculate insurance premiums using basic risk models.</p>												
<p>Content</p>	<p>Mata kuliah ini membahas: dasar-dasar teori resiko, ketidakpastian, peluang, distribusi peluang, data statistik, pencocokan data, distribusi agregat, peramalan dengan ketidakpastian, pemodelan korelasi, copula, optimasi dalam analisis resiko.</p> <p><i>The course covers: basics of risk theory, accuracy, probability, probability distribution, statistical data, data matching, aggregate distribution, forecasting by mapping, correlation modeling, copula, optimization in risk analysis.</i></p>												
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Reading List

[?]Gunakan style APA

### PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CO 1						
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## MODULE HANDBOOK

Module name	Pengantar Manajemen Investasi <i>Introduction to Investment Management</i>
Module level, if applicable	Sarjana/S1 <i>Bachelor</i>
Code, if applicable	22060112E78
Courses, if applicable	Pengantar Manajemen Investasi <i>Introduction to Investment Management</i>
Semester(s) in which the module is taught	6 <sup>th</sup>
Person responsible for the module	Ketua konsorsium Statistika dan Aktuaria <i>Chair of Statistics and Actuarial Consortium</i>
Lecturers	Abdul Aziz, M.Si
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Relation to curriculum	Mata kuliah Pilihan <i>Elective Course</i>
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Workload	Total beban perkuliahan adalah 136 jam per semester, yang terdiri atas 150 menit perkuliahan per minggu selama 14 minggu, 180 menit aktivitas terstruktur per minggu, 180 menit belajar mandiri per minggu, dengan total 16 minggu per semester termasuk UTS dan UAS.  <i>The overall workload for each semester is 136 hours. This includes 150 minutes of weekly lectures for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study each week, summing up to 16 weeks per semester, encompassing both mid-term and final examinations.</i>
Credit points	3 Credits (4,41 ECTS)
Requirements according to the examination regulations	Mahasiswa telah mengikuti mata kuliah Pengantar Manajemen Investasi sekurang-kurangnya 80% dari pertemuan.  <i>The students have attended the Introduction to Risk Theory course for a minimum of 80% of the scheduled sessions.</i>
Recommended prerequisites	[?]MK prasyarat



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Module objectives/intended learning outcomes	<p>Mahasiswa mampu untuk:</p> <p>CO1. mengembangkan pemahaman yang kuat tentang konsep investasi mendasar, termasuk risiko dan pengembalian, diversifikasi, alokasi aset, dan nilai waktu uang.</p> <p>CO2. menganalisis dan memperkirakan hasil investasi, termasuk metode seperti analisis mean-variance, CAPM, dan model faktor</p> <p>CO3. identifikasi metode penilaian ekuitas, termasuk analisis arus kas yang didiskontokan (DCF), teknik penilaian relatif (misalnya, rasio harga terhadap pendapatan, rasio harga terhadap buku), dan model diskon dividen.</p> <p><i>Students are able to:</i></p> <p>CO1. <i>develop a strong understanding of fundamental investment concepts, including risk and return, diversification, asset allocation, and the time value of money</i></p> <p>CO2. <i>analyze and forecast investment returns, including methods such as mean-variance analysis, CAPM, and factor models</i></p> <p>CO3. <i>Identify equity valuation methods, including discounted cash flow (DCF) analysis, relative valuation techniques (e.g., price-to-earnings ratio, price-to-book ratio), and dividend discount models.</i></p>												
Content	<p>Mata kuliah ini membahas Investasi, dasar-dasar manajemen investasi.</p> <p><i>The course covers: investments, basics of investment management.</i></p>												
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