

**MODULE HANDBOOK**  
**BIOSTATISTICS**



**BACHELOR DEGREE PROGRAM**  
**DEPARTMENT OF STATISTICS**  
**FACULTY OF SCIENCE AND DATA ANALYTICS**  
**INSTITUT TEKNOLOGI SEPULUH NOPEMBER**  
**SURABAYA, INDONESIA**

## ENDORSEMENT PAGE



# MODULE HANDBOOK BIostatISTICS DEPARTMENT OF STATISTICS INSTITUT TEKNOLOGI SEPULUH NOPEMBER

| Proses<br><i>Process</i>                                       | Penanggung Jawab<br><i>Person in Charge</i>  |                                                             |                                 | Tanggal<br><i>Date</i> |
|----------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------|---------------------------------|------------------------|
|                                                                | Nama<br><i>Name</i>                          | Jabatan<br><i>Position</i>                                  | Tandatangan<br><i>Signature</i> |                        |
| Perumus<br><i>Preparation</i>                                  | Jerry Dwi Trijoyo<br>Purnomo, S.Si.<br>M.Si. | Dosen<br><i>Lecturer</i>                                    |                                 | March 28, 2019         |
| Pemeriksa dan<br>Pengendalian<br><i>Review and<br/>Control</i> | Dr. Santi Wulan<br>Purnami, S.Si,<br>M.Si    | Tim kurikulum<br><i>Curriculum<br/>team</i>                 |                                 | April 15, 2019         |
| Persetujuan<br><i>Approval</i>                                 | Dr. Bambang<br>Widjanarko<br>Otok, M.Si      | Koordinator<br>RMK<br><i>Course Cluster<br/>Coordinator</i> |                                 | July 17, 2019          |
| Penetapan<br><i>Determination</i>                              | Dr. Kartika<br>Fithriasari, M.Si             | Kepala<br>Departemen<br><i>Head of<br/>Department</i>       |                                 | July 30, 2019          |

# MODULE HANDBOOK

## BIostatISTICS

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Module name                                           | <b>Biostatistics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |
| Module level                                          | Undergraduate                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |
| Code                                                  | KS184555                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |
| Course (if applicable)                                | Biostatistics                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |
| Semester                                              | 5 (Odd)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |
| Person responsible for the module                     | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si.                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |
| Lecturer                                              | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si.; Dr. Santi Wulan Purnami, S.Si, M.Si                                                                                                                                                                                                                                                                                                                                                                                                        |       |
| Language                                              | Bahasa Indonesia and English                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |
| Relation to curriculum                                | Undergraduate degree program, <b>elective</b> , 5 <sup>th</sup> semester.                                                                                                                                                                                                                                                                                                                                                                                                          |       |
| Type of teaching, contact hours                       | Lectures, <50 students                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |
| Workload                                              | 1. Lectures: 3 x 50 = 150 minutes per week.<br>2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week.<br>3. Private learning: 3 x 60 = 180 minutes (3 hours) per week.                                                                                                                                                                                                                                                                                             |       |
| Credit points                                         | 3 credit points (sks)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |
| Requirements according to the examination regulations | A student must have attended at least 80% of the lectures to sit in the exams.                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| Mandatory prerequisites                               | Non-Parametric Statistics<br>Category Data Analysis<br>Sampling and Survey Techniques                                                                                                                                                                                                                                                                                                                                                                                              |       |
| Learning outcomes and their corresponding PLOs        | CLO.1 Able to describe the concept of inferential statistics for the medical/health and agriculture/fishery data                                                                                                                                                                                                                                                                                                                                                                   | PLO.1 |
|                                                       | CLO.2 Able to use the medical/health and agriculture/fishery data to solve the task                                                                                                                                                                                                                                                                                                                                                                                                | PLO.3 |
|                                                       | CLO.3 Able to formulate problem-solving in analyzing the medical/health and agriculture/fishery data with the appropriate interpretation                                                                                                                                                                                                                                                                                                                                           |       |
|                                                       | CLO.4 Able to identify, formulate, and solve the biostatistics problem<br>CLO.5 Able to use computational technique and modern computer, including selecting the appropriate method that used in solving the case of medical/health and agriculture/fishery data<br>CLO.6 Have insight about the current issue and upcoming issue relating to the biostatistics<br>CLO.7 Able to communicate effectively and collaborate with the teams in interdisciplinary and multidisciplinary | PLO.4 |

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
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|                                                             | CLO.8 Have responsibilities and professional ethics<br>CLO.9 Able to motivate themselves to think creatively and lifelong learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Content                                                     | <p>Biostatistics is a part of statistics course that can be applied to Environmental And Health cases. The objectives of learning biostatistics are to prepare the students relating to the ability in analyzing the medical data, agriculture/fishery/marine using the appropriate statistical methods (quantitative and qualitative). In order to enhance the knowledge about the application of statistics, there are various research designs to be learned, namely Cross-Sectional Study; Case-Control Study; Cohort Study, and other measurements of Epidemiology (Incidence, Prevalence). The learning strategies used in this course are discussion, exercises, and study case (secondary data).</p> |  |
| Study and examination requirements and forms of examination | <ul style="list-style-type: none"> <li>• In-class exercises</li> <li>• Assignment</li> <li>• Mid-term exam</li> <li>• Final exam</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Media employed                                              | LCD, whiteboard, websites (myITS Classroom), zoom.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Reading list                                                | <ol style="list-style-type: none"> <li>1. Rosner, Bernard. 2006. Fundamentals of Biostatistics. 6th edition. Thomson Brooks/Cole.</li> <li>2. M, Last J. 2001. A Dictionary of Epidemiology. 4th edition. Oxford: Oxford University Press.</li> <li>3. Pagano, Marcello and Gauvreau, Kimberlee. 2000. Principles of Biostatistics. 2nd edition. CA, USA: Duxbury Thomson Learning.</li> <li>4. Modul kuliah</li> <li>5. W, Wayne Daniel. 1978. Biostatistics: A Foundation for Analysis in the Health Sciences. 3rd edition. NY: John Wiley dan Sons.</li> </ol>                                                                                                                                            |  |

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|-----------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------|
|  | Program Studi    | Sarjana, Departemen Statistika, FMKSD-ITS                                          |
|                                                                                   | Mata Kuliah      | Biostatistika                                                                      |
|                                                                                   | Kode Mata Kuliah | KS184555                                                                           |
|                                                                                   | Semester/SKS     | V/3                                                                                |
|                                                                                   | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1                                                                             | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Bahan Kajian</b>           | Dasar Sains, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, Pemodelan, Pemerintahan dan Kependudukan, Kesehatan dan Lingkungan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Study Materials</b>        | <i>Basic Science, Statistical Theory, Data collection, Description and Exploration, Computing and Data Processing, Modeling, Government and Population, Health and Environment</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>CPL yang dibebankan MK</b> | CPL-1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi<br>CPL-3 Mampu menganalisis data dengan metode statistika yang tepat dan menginterpretasikannya<br>CPL-4 Mampu mengidentifikasi, memformulasi, dan menyelesaikan masalah statistika di berbagai bidang terapan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>PLO</b>                    | <i>PLO-1 Able to apply knowledge of science, statistical theory, mathematics, and computing to problems in various applied fields</i><br><i>PLO-3 Able to analyze data using appropriate statistical methods and interpret them</i><br><i>PLO-4 Able to identify, formulate, and solve statistical problems in various applied fields</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>CP-MK</b>                  | CPMK.1 Mampu menjelaskan konsep statistika inferens untuk data kedokteran/kesehatan, pertanian/perikanan<br>CPMK.2 Mampu memanfaatkan data kedokteran/kesehatan, pertanian/perikanan untuk mendukung penyelesaian pekerjaan<br>CPMK.3 Mampu memformulasikan penyelesaian masalah dengan menganalisis data kedokteran/kesehatan, pertanian/perikanan serta menginterpretasikan dengan tepat<br>CPMK.4 Mampu mengidentifikasi, memformulasi, dan menyelesaikan masalah biostatistik<br>CPMK.5 Mampu menggunakan teknik komputasi dan perangkat komputer modern yang diperlukan serta mampu memilih metode yang sesuai bagi data kedokteran/kesehatan, pertanian/perikanan dalam menyelesaikan masalah riil<br>CPMK.6 Memiliki pengetahuan tentang isu terkini dan mendatang yang berkaitan dengan bidang biostatistika<br>CPMK.7 Mampu berkomunikasi secara efektif dan bekerjasama dalam tim yang interdisiplin dan multidisiplin<br>CPMK.8 Memiliki tanggung jawab dan etika profesi<br>CPMK.9 Mampu memotivasi diri untuk berpikir kreatif dan belajar sepanjang hayat |
| <b>CLO</b>                    | <i>CLO.1 Able to describe the concept of inferential statistics for the medical/health and agriculture/fishery data</i><br><i>CLO.2 Able to use the medical/health and agriculture/fishery data to solve the task</i><br><i>CLO.3 Able to formulate problem-solving in analyzing the medical/health and agriculture/fishery data with the appropriate interpretation</i><br><i>CLO.4 Able to identify, formulate, and solve the biostatistics problem</i><br><i>CLO.5 Able to use computational technique and modern computer, including selecting the appropriate method that used in solving the case of medical/health and agriculture/fishery data</i><br><i>CLO.6 Have insight about the current issue and upcoming issue relating to the biostatistics</i><br><i>CLO.7 Able to communicate effectively and collaborate with the teams in interdisciplinary and multidisciplinary</i><br><i>CLO.8 Have responsibilities and professional ethics</i>                                                                                                                |

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|       | Program Studi    | Sarjana, Departemen Statistika, FMKSD-ITS                                          |
|       | Mata Kuliah      | Biostatistika                                                                      |
|       | Kode Mata Kuliah | KS184555                                                                           |
|       | Semester/SKS     | V/3                                                                                |
|       | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1 | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

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|  | CLO.9 <i>Able to motivate themselves to think creatively and lifelong learning</i> |
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| Pertemuan<br>Meeting | Kemampuan Akhir<br>Sub CP-MK<br>Final Ability                                                                                                                                                        | Keluasan (materi<br>pembelajaran)<br>Extent (learning material)                                                                                                                                                      | Metode<br>Pembelajaran<br>Learning methods                                                                  | Estimasi<br>Waktu<br>Duration   | Bentuk Evaluasi<br>Evaluation Type                      | Kriteria dan Indikator Penilaian<br>Assessment Criteria and Indicators                                                                                                                                                                                                           | Bobot<br>Penilaian<br>Scoring |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1                    | 1. Dapat menjelaskan penerapan metode statistika pada bidang kesehatan, lingkungan secara umum<br><i>1. Able to explain the application of statistical methods in medical/health data in general</i> | Pengantar Biostatistika: Definisi Biostatistika dan aplikasi di bidang kesehatan, lingkungan, dan biologi<br><i>Introduction to Biostatistics: Definition and Application in health, environment, and biology.</i>   | Ceramah Interaktif<br>Diskusi<br><i>Interactive Lecture Discussion</i>                                      | 150 menit<br><i>150 minutes</i> | Observasi di Kelas<br><i>Observe the class activity</i> | 1.1. Memahami peran statistika pada bidang kesehatan, lingkungan, biologi<br>1.2. Dapat menjelaskan pengertian Biostatistika<br><i>1.1. Understand the role of statistics in health, environment, and biology</i><br><i>1.2. Able to explain the definition of biostatistics</i> | 5%/ 5%                        |
| 2                    | 2. Mampu membedakan desain penelitian observasional<br><i>2. Able to identify the observational research design</i>                                                                                  | Macam – Macam Desain Penelitian Observasional (Study Cross Sectional; Study Case Control; Study Cohort);<br><i>Types of Observational Research Designs (Cross-Sectional Study; Case-Control Study; Cohort Study)</i> | Ceramah Interaktif<br>Latihan soal<br>Diskusi<br><i>Interactive Lecture Discussion Exercises Discussion</i> | 150 menit<br><i>150 minutes</i> | Observasi di kelas<br><i>Observe the class activity</i> | 2.1. Memahami macam desain penelitian observasional dalam bidang kesehatan<br>2.2. Dapat membedakan penentuan variabel untuk Study Cross Sectional; Study Case Control; Study Cohort;<br><i>2.1. Understand the types of Observational Research Designs in the health sector</i> | 7%/ 12%                       |

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|       | Kode Mata Kuliah | KS184555                                                                           |
|       | Semester/SKS     | V/3                                                                                |
|       | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1 | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

| Perte-<br>muan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                                                                                                                                               | Keluasan (materi<br>pembelajaran)<br><i>Extent (learning material)</i>                                                                                                                                                                                                                                                  | Metode<br>Pembelajaran<br><i>Learning methods</i>                                                | Estimasi<br>Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                                | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                                                                                                 | Bobot<br>Penilaian<br><i>Scoring</i> |
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|                                  |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                         |                                                                                                  |                                      |                                                                                          | 2.2. <i>Able to distinguish the use of variables for Cross Sectional Study; Case Control Study; Cohort Study;</i>                                                                                                                                                                                                                             |                                      |
| 3                                | 3. Mampu mengukur angka morbiditas<br><i>3. Able to measure morbidity</i>                                                                                                                                                                          | Ukuran-Ukuran Epidemiologi (Insidensi, Prevalensi)<br><i>Epidemiological Measures (Incidence, Prevalence)</i>                                                                                                                                                                                                           | Ceramah Interaktif<br>PBL<br>Latihan soal<br><i>Interactive Lecture Discussion PBL Exercises</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas<br>Latihan soal<br><i>Observe the class activity Exercises</i>        | 3.1. Dapat memahami cara Mengukur Masalah Penyakit (Angka Kesakitan / Morbiditas)<br>3.2. Dapat menghitung ukuran morbiditas angka insidensi & prevalensi<br><i>3.1. Understand the measurement of Measure Disease Problem (Morbidity)</i><br><i>3.2. Able to calculate the incidence and prevalence morbidity</i>                            | 10%/ 22%                             |
| 4                                | 4. Mampu menerapkan penentuan distribusi diskret dari suatu kejadian dengan tepat dan menghitung peluang dist normal<br><i>4. Able to determine the discrete distribution of an event and calculate the probability of the normal distribution</i> | Review statistik Deskriptif dan peluang<br>- Penyajian data deskriptif<br>- distribusi diskret<br>- distribusi Normal<br>Aplikasi pada beberapa kasus<br><i>Review of Descriptive Statistics and Probabilities</i><br>- <i>Descriptive statistics</i><br>- <i>Discrete distribution</i><br>- <i>Normal distribution</i> | Ceramah Interaktif Diskusi<br>Latihan soal<br><i>Interactive Lecture Discussion Exercises</i>    | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas<br>Penyelesaian kasus<br><i>Observe the class activity Case study</i> | 4.1. Dapat menyajikan data secara tepat baik dengan table maupun grafik.<br>4.2. Dapat memahami suatu kejadian mengikuti distribusi diskret tertentu dan dapat menghitung peluang kejadiannya<br>4.3. Dapat menghitung peluang distribusi normal (manual maupun tabel)<br><i>4.1. Able to present the data properly using table and graph</i> | 7% / 29%                             |

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|       | Mata Kuliah      | Biostatistika                                                                      |
|       | Kode Mata Kuliah | KS184555                                                                           |
|       | Semester/SKS     | V/3                                                                                |
|       | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
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| Perte-<br>muan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                                                                                                                                    | Keluasan (materi<br>pembelajaran)<br><i>Extent (learning material)</i>                                                                                                                                                       | Metode<br>Pembelajaran<br><i>Learning methods</i>                   | Estimasi<br>Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                                                   | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                                                                      | Bobot<br>Penilaian<br><i>Scoring</i> |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|                                  |                                                                                                                                                                                                                                         | <i>Application in real cases</i>                                                                                                                                                                                             |                                                                     |                                      |                                                                                                             | 4.2. <i>Understand the discrete distribution of an event and calculate the probability</i><br>4.3. <i>Able to calculate the probability of normal distribution (manually and using normal distribution table)</i>                                                                                                  |                                      |
| 5                                | 5. Mampu menerapkan estimasi parameter dan merumuskan testing hipotesis yang sesuai pada kejadian riil<br><br>5. <i>Able to compute the suitable parameter estimation and formulate the hypothesis testing in the real case problem</i> | Review statistik parametrik<br>- estimasi,<br>- testing hipotesis,<br><br>Aplikasi pada beberapa kasus<br><i>Review of Parametric Statistics</i><br>- estimation<br>- hypothesis testing<br><i>Application in real cases</i> | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas<br>Penyelesaian kasus<br><b>Tes</b><br><i>Observe the class activity Case study Test</i> | 5.1. Dapat melakukan estimasi parameter dengan baik<br>5.2. Dapat menyusun hipotesis dan melakukan pengujian parameter untuk satu dan dua sampel<br><br>5.1. <i>Able to estimate the parameter properly</i><br>5.2. <i>Able to compute the hypothesis and testing the parameter for one sample and two samples</i> | 7%/ 36%                              |
| 6                                | 6. Mampu melakukan pengujian median dengan uji tanda dan wilcoxon untuk kejadian riil<br><br>6. <i>Able to compute the median test using</i>                                                                                            | Review statistik non parametrik<br>- Uji tanda<br>- Uji Wilcoxon<br>Aplikasi pada beberapa kasus                                                                                                                             | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas<br>Penyelesaian kasus<br><i>Observe the class activity Case study</i>                    | 6.1. Dapat melakukan pengujian median untuk data ordinal.<br>6.2. Dapat melakukan pengujian ranking wilcoxon untuk kejadian biologi, kesehatan dan lingkungan<br><br>6.1. <i>Able to perform the median test for ordinal data</i>                                                                                  | 7%/ 43%                              |



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|       | Mata Kuliah      | Biostatistika                                                                      |
|       | Kode Mata Kuliah | KS184555                                                                           |
|       | Semester/SKS     | V/3                                                                                |
|       | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1 | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

| Pertemuan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                  | Keluasan (materi pembelajaran)<br><i>Extent (learning material)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Metode Pembelajaran<br><i>Learning methods</i>                      | Estimasi Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                             | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bobot Penilaian<br><i>Scoring</i> |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|                             | <i>sign test and Wilcoxon for the real case problem</i>                                                               | <i>Review of Non-Parametric Statistics</i><br>- <i>sign test</i><br>- <i>Wilcoxon test</i><br><i>Application in real cases</i>                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                     |                                   |                                                                                       | 6.2. <i>Able to perform the rank Wilcoxon test for cases in biology, health, and environment.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |
| 7                           | 7. Mampu melakukan pengujian data kategorikal dengan baik<br><br>7. <i>Able to test the categorical data properly</i> | Estimasi dan Pengujian Hipotesis: data kategorik<br>- Pengujian dua proporsi<br>- Kontingensi tabel (uji $\chi^2$ )<br>- Uji Mc Nemar<br>- Hubungan antara Uji Wilcoxon dan uji $\chi^2$<br>- Statistik Kappa<br>- Aplikasi pada beberapa Kasus<br><i>Estimation and hypothesis testing: categorical data</i><br>- <i>Test of proportion for two samples</i><br>- <i>Contingency table (<math>\chi^2</math> test)</i><br>- <i>Mc Nemar test</i><br>- <i>The relation between Wilcoxon test and <math>\chi^2</math> test</i><br>- <i>Kappa statistics</i> | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>   | Observasi di Kelas Penyelesaian kasus<br><i>Observe the class activity Case study</i> | 7.1. Dapat melakukan pengujian kasus binomial dengan menggunakan uji proporsi<br>7.2. Dapat melakukan pengujian dari tabel kontingensi (2x2 maupun rxc)<br>7.3. Dapat menunjukkan hubungan antara Uji Wilcoxon dan uji $\chi^2$ Untuk tabel kontingensi 2 x k<br>7.4. Mampu menerapkan pada kasus riil<br><i>7.1. Able to perform the binomial test using the test of proportion</i><br><i>7.2. Able to perform the test for contingency table with a size of 2x2 and rxc</i><br><i>7.3. Able to explain the relation between Wilcoxon test and <math>\chi^2</math> test for contingency table with a size of 2xk</i><br><i>7.4. Able to apply in real cases</i> | 7%/ 50%                           |

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|                                                                                   | Mata Kuliah      | Biostatistika                                                                      |
|                                                                                   | Kode Mata Kuliah | KS184555                                                                           |
|                                                                                   | Semester/SKS     | V/3                                                                                |
|                                                                                   | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1                                                                             | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

| Perte-<br>muan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                                      | Keluasan (materi<br>pembelajaran)<br><i>Extent (learning material)</i>                                                                                                                                                                                                                                                                                               | Metode<br>Pembelajaran<br><i>Learning methods</i>                   | Estimasi<br>Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                                                                                                | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                                                                                                 | Bobot<br>Penilaian<br><i>Scoring</i> |
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|                                  |                                                                                                                                           | - <i>Application in real cases</i>                                                                                                                                                                                                                                                                                                                                   |                                                                     |                                      |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                               |                                      |
| 8                                | <b>ETS</b><br><b>MIDTERM EXAM</b>                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                      |                                                                     |                                      |                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                               |                                      |
| 9                                | 8. Mampu menghitung dan menginterpretasikan RR dan OR dengan baik<br><br>8. <i>Able to calculate and interpret the RR and OR properly</i> | Metode analisis untuk biostatistik dengan Pengukuran pengaruh data kategorik<br>- Mengukur Risk ratio<br>- Mengukur Odds Ratio<br>- Aplikasi pada beberapa kasus<br><br><i>Biostatistics methods using the measurement of the effect of categorical data</i><br>- <i>Calculate Risk Ratio</i><br>- <i>Calculate Odds Ratio</i><br>- <i>Application in real cases</i> | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas Penyelesaian kasus Dan latihan soal<br><b>ETS</b><br><i>Observe the class activity Case study Exercises of midterm exam questions</i> | 8.1. Dapat menghitung dan menginterpretasikan hasil perhitungan Risk ratio (rasio resiko/ resiko relatif RR) dan odds ratio (OR) dari suatu kejadian<br>8.2. Mampu menerapkan pada kasus riil<br><i>8.1. Able to calculate and interpret the result of Risk Ratio and Odds Ratio for the cases</i><br><i>8.2. Able to apply in real cases</i> | 7%/ 57%                              |
| 10                               | 9. Mampu menentukan variabel confounding dan standarisasi<br><br>9. <i>Able to define the Confounding and Standardization variables</i>   | <i>confounding</i> dan standarisasi<br><i>Confounding and Standardization</i>                                                                                                                                                                                                                                                                                        | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas Penyelesaian kasus<br><i>Observe the class activity Case study</i>                                                                    | 9.1. Dapat melakukan kontrol terhadap variabel <i>counfounding</i><br>9.2. Dapat melakukan standarisasi pada variabel <i>Counfounding</i> (variabel pembentuk)<br><i>9.1. Able to control confounding variables</i>                                                                                                                           | 7%/ 64%                              |

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|       | Program Studi    | Sarjana, Departemen Statistika, FMKSD-ITS                                          |
|       | Mata Kuliah      | Biostatistika                                                                      |
|       | Kode Mata Kuliah | KS184555                                                                           |
|       | Semester/SKS     | V/3                                                                                |
|       | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1 | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

| Perte-<br>muan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                                                                                          | Keluasan (materi<br>pembelajaran)<br><i>Extent (learning material)</i>                                                                                                                                                                                                                                                                                                                                                                       | Metode<br>Pembelajaran<br><i>Learning methods</i>                   | Estimasi<br>Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                                                           | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                                                                                                                                                                                                                                                         | Bobot<br>Penilaian<br><i>Scoring</i> |
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|                                  |                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                     |                                      |                                                                                                                     | 9.2. <i>Able to standardize the confounding variables</i>                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |
| 11                               | 10. Mampu menghitung OR untuk data berstrata dan menguji dengan menggunakan Mantel Haenszel test<br><br>10. <i>Able to calculate OR for stratified data and use the Mantel Haenszel test.</i> | Uji Mantel Haenszel :<br>- Odds Ratio untuk data stratified dalam tabel kontingensi k 2x2<br>- Uji Chi Square untuk Trend-Multiple strata (Mantel Extension Test)<br>- Aplikasi beberapa kasus<br><i>The Mantel Haenszel Test</i><br>- <i>Odds Ratio for stratified data in contingency table with a size of 2x2</i><br>- <i>Chi square test for stratified trend-multiple (Mantel Extension test)</i><br>- <i>Application in real cases</i> | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas<br>Penyelesaian kasus dan Latihan soal<br><i>Observe the class activity Case study Exercises</i> | 10.1. dapat menghitung OR data stratifikasi dan menginterpretasikan hasilnya<br>10.2. dapat melakukan pengujian kecenderungan pada k strata dengan menggunakan tabel kontingensi 2x2 (2 kategori)<br>10.3. Mampu menerapkan pada kasus riil<br><br>10.1. <i>Able to calculate the OR for stratified data and interpret the result</i><br>10.2. <i>Able to perform the trend test for k-strata using contingency table with a size of 2x2 (2 category)</i><br>10.3. <i>Able to apply in real cases</i> | 7%/ 71%                              |
| 12                               | 11. Mampu membangun dan menginterpretasikan model regresi logistik berganda dengan baik<br><br>11. <i>Able to compute and interpret the multiple</i>                                          | Regresi logistik Berganda,<br>- Pengertian regresi logistik<br>- Model regresi logistik berganda<br>- Interpretasi model<br>- Aplikasi pd beberapa kasus                                                                                                                                                                                                                                                                                     | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas<br>Penyelesaian kasus<br><b>Tes</b><br><i>Observe the class activity Case study Test</i>         | 11.1. Dapat membuat model regresi logistik berganda dari data dichotomous pada kasus riil<br>11.2. Dapat menginterpretasikan estimasi parameter Regresi logistik berganda                                                                                                                                                                                                                                                                                                                             | 7%/ 78%                              |

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|       | Program Studi    | Sarjana, Departemen Statistika, FMKSD-ITS                                          |
|       | Mata Kuliah      | Biostatistika                                                                      |
|       | Kode Mata Kuliah | KS184555                                                                           |
|       | Semester/SKS     | V/3                                                                                |
|       | MK Prasyarat     | Statistika Nonparametrik, Analisis Data Kategori, Teknik Sampling dan Survei       |
| RP-S1 | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

| Perte-<br>muan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                          | Keluasan (materi<br>pembelajaran)<br><i>Extent (learning material)</i>                                                                                                                                                                                                                                                                                                                              | Metode<br>Pembelajaran<br><i>Learning methods</i>                   | Estimasi<br>Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                             | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                                                                                                                                                                                                                                                                | Bobot<br>Penilaian<br><i>Scoring</i> |
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|                                  | <i>logistic regression properly</i>                                                                                           | <i>Multiple Logistic Regression</i> <ul style="list-style-type: none"> <li>- <i>Definition of logistic regression</i></li> <li>- <i>Multiple Logistic Regression Model</i></li> <li>- <i>Interpretation of the model</i></li> <li>- <i>Application in real cases</i></li> </ul>                                                                                                                     |                                                                     |                                      |                                                                                       | 11.3. Mampu menerapkan pada kasus riil<br><i>11.1. Able to build the Multiple Logistic Regression model for dichotomous data in real cases</i><br><i>11.2. Able to interpret and estimate the parameter of Multiple Logistic Regression</i><br><i>11.3. Able to apply in real cases</i>                                                                                                                                                                                                                      |                                      |
| 13                               | 12. Mampu melakukan pengujian data biner dari dua kelompok sampel<br><i>12. Able to test the binary data from two samples</i> | Pengelompokan data biner:<br><ul style="list-style-type: none"> <li>- Uji membandingkan dua proporsi (data biner)</li> <li>- Penentuan kekuatan pengujian</li> <li>- Penentuan ukuran sampel</li> <li>- Aplikasi pada beberapa kasus</li> </ul> <i>Grouping the binary data:</i> <ul style="list-style-type: none"> <li>- <i>Test of comparison between two proportion (binary data)</i></li> </ul> | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i> | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas Penyelesaian kasus<br><i>Observe the class activity Case study</i> | 12.1. Dapat melakukan pengujian perbandingan dua proporsi sebagai data biner data dua kelompok sampel<br>12.2. Menghitung kekuatan pengujian (1- $\beta$ )<br>12.3. Menentukan ukuran sampel masing-masing kelompok<br>12.4. Mampu menerapkan pada kasus riil<br><i>12.1. Able to test the comparison between two proportion as binary data for two samples</i><br><i>12.2. Able to calculate the power test (1-<math>\beta</math>)</i><br><i>12.3. Able to define the optimal sample size in each group</i> | 6%/ 84%                              |

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|       | Mata Kuliah      | Biostatistika                                                                      |
|       | Kode Mata Kuliah | KS184555                                                                           |
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| Perte-<br>muan<br><i>Meeting</i> | Kemampuan Akhir<br>Sub CP-MK<br><i>Final Ability</i>                                                                                   | Keluasan (materi<br>pembelajaran)<br><i>Extent (learning material)</i>                                                                                                     | Metode<br>Pembelajaran<br><i>Learning methods</i>                        | Estimasi<br>Waktu<br><i>Duration</i> | Bentuk Evaluasi<br><i>Evaluation Type</i>                                                                      | Kriteria dan Indikator Penilaian<br><i>Assessment Criteria and Indicators</i>                                                                                                                                                                                   | Bobot<br>Penilaian<br><i>Scoring</i> |
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|                                  |                                                                                                                                        | <ul style="list-style-type: none"> <li>- Define the power of test statistics</li> <li>- Define the appropriate sample size</li> <li>- Application in real cases</li> </ul> |                                                                          |                                      |                                                                                                                | 12.4. Able to apply in real cases                                                                                                                                                                                                                               |                                      |
| 14                               | 13. Dapat melakukan pengujian hipotesis untuk data longitudinal<br><i>13. Able to perform hypothesis testing for longitudinal data</i> | Pengujian Hipotesis untuk data longitudinal<br><i>Hypothesis Testing for Longitudinal Data</i>                                                                             | Ceramah Interaktif Diskusi<br><i>Interactive Lecture Discussion</i>      | 150 menit<br><i>150 minutes</i>      | Observasi di Kelas Penyelesaian kasus<br><b>EAS</b><br><i>Observe the class activity Case study Final Exam</i> | 13.1 Memahami kasus yang menggunakan data longitudinal<br>13.2 Dapat melakukan pengujian kasus untuk data longitudinal<br><i>13.1 Understand the characteristics of cases that use the longitudinal data 13.2 Able to test the cases with longitudinal data</i> | 6%/ 90%                              |
| 15                               | 14. Mampu melakukan analisis biostatistika pada beberapa kasus<br><i>14. Able to analyze the real case using biostatistics</i>         | Studi kasus<br><i>Study case</i>                                                                                                                                           | Diskusi, Laporan/ makalah kasus<br><i>Discussion, Report/ Study case</i> | 150 menit<br><i>150 minutes</i>      | Presentasi hasil studi kasus<br><i>Presentation of the study case result</i>                                   | Mampu menerapkan metode statistika dengan tepat pada kasus riil bidang biologi, kesehatan dan lingkungan<br><i>Able to apply the appropriate statistical methods for the real cases in biology, health, and environment.</i>                                    | 10%/ 100%                            |
| 16                               | <b>EAS</b><br><b>FINAL EXAM</b>                                                                                                        |                                                                                                                                                                            |                                                                          |                                      |                                                                                                                |                                                                                                                                                                                                                                                                 |                                      |

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|                                                                                   | Mata Kuliah      | Biostatistika                                                                      |
|                                                                                   | Kode Mata Kuliah | KS184555                                                                           |
|                                                                                   | Semester/SKS     | V/3                                                                                |
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| <b>RP-S1</b>                                                                      | Dosen Pengampu   | Jerry Dwi Trijoyo Purnomo, S.Si. M.Si., Ph.D ; Dr. Santi Wulan Purnami, S.Si, M.Si |

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