## RENCANA PEMBELAJARAN SEMESTER

| MATA KULIAH (MK) | KODE | Rumpun MK | BOBOT (sks) | | | SEMESTER | Tgl Penyusunan |
|---|---|---|---|---|---|---|---|
| biostatistik dan biokomputer | 8420502309 | Mata Kuliah Wajib Program Studi | T=2 | P=0 | ECTS=3.18 | 4 | 20 Juni 2022 |

| OTORISASI | Pengembang RPS | Koordinator RMK | Koordinator Program Studi |
|---|---|---|---|
| | Dr. Muji Sri Prastiwi, M.Pd. | Prof. Dr. Ir. Dyah Hariani, M.Si. | Dr. Rinie Pratiwi Puspitawati, M.Si. |

| Model Pembelajaran | **Project Based Learning** |
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| Capaian Pembelajaran (CP) | **CPL-PRODI yang dibebankan pada MK** |
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| | **Capaian Pembelajaran Mata Kuliah (CPMK)** |

| CPMK - 1 | Understand the objective of statistics, type of data and scale data measurement in biology and educational research. |
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| CPMK - 2 | Understand the utilization of computers for statistics |
| CPMK - 3 | Able to design research experiments and analyze collected data. |
| CPMK - 4 | Able to apply transferable skills to develop eco-commitment in an effort to realize the character of Faith, Smart, Independent, Honest, Caring and Tough. |
| CPMK - 5 | Able to draw conclusions based on statistical data analysis . |

**Matrik CPL - CPMK**

| CPMK |
|---|
| CPMK-1 |
| CPMK-2 |
| CPMK-3 |
| CPMK-4 |
| CPMK-5 |

**Matrik CPMK pada Kemampuan akhir tiap tahapan belajar (Sub-CPMK)**

| CPMK | Minggu Ke | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| CPMK-1 | | | | | | | | | | | | | | | | |
| CPMK-2 | | | | | | | | | | | | | | | | |
| CPMK-3 | | | | | | | | | | | | | | | | |
| CPMK-4 | | | | | | | | | | | | | | | | |
| CPMK-5 | | | | | | | | | | | | | | | | |

| Deskripsi Singkat MK | This course discusses the basics of biostatistics in practice and computer-based research, including data format and visualization, descriptive statistics including central tendency (mean, median, and mode), and spread (standard deviation, variation, IQR), normal distribution; hypothesis testing; analysis of variance, correlation-regression analysis, analysis of covariance, and nonparametric statistics. Lectures are delivered using a student-centered approach in practical activities and assignments, while practical work is carried out using computer programs. These two learning activities are carried out to facilitate students to work honestly and independently. |
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| Pustaka | **Utama :** |
|---|---|
| | 1. Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press |
| | **Pendukung :** |

1. Kusriningrum-RS, 2008. Perancangan Percobaan. Surabaya: Airlangga University Press.
2. Gomez, K.A. 1984. Statistical Procedures for Agricultural Research, 2nd Edition. Wiley-Interscience
3. Snedecor, G.W. 1989. Statistical Methods Eighth Edition. Ames. Iowa State University Press.
4. Steel dan Torrie, 1996. Principle and Procedure Statistics: A Biometrical Approach. New York: McGraw Hill Book Comp

| Dosen Pengampu | Prof. Dr. Ir. Dyah Hariani, M.Si.<br>Dr. Muji Sri Prastiwi, S.Pd., M.Pd.<br>Erlix Rakhmad Purnama, S.Si., M.Si.<br>Dr. Pramita Yakub, S.Pd., M.Pd.<br>Putut Rakhmad Purnama, S.Si, M.Si. |
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| Mg Ke- | Kemampuan akhir tiap tahapan belajar (Sub-CPMK) | Penilaian | | Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [ Estimasi Waktu] | | Materi Pembelajaran [ Pustaka ] | Bobot Penilaian (%) |
|---|---|---|---|---|---|---|---|
| | | Indikator | Kriteria & Bentuk | Luring (*offline*) | Daring (*online*) | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1 | 1. Understand the meaning of statistics and its benefits.<br>2. Understand the concept of data and measurement scales. | 1. Define the statistics term.<br>2. Explain the importance and benefit of statistics.<br>3. Explain the data type and data format.<br>4. Provide examples of each data type.<br>5. Define the type of scale/level of data measurement. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%.<br><br>**Bentuk Penilaian** : Aktifitas Partisipasif | The lecturer explained the Biostatistics study plan and learning activities using the case method learning model to provide real Biology research experience and its application in educational research. 2 X 50 | - | **Materi:** Pengantar Biostatistik **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 0% |
| 2 | 1. Being familiar with statistical programs such as Ms.Excel, SPSS, and R Studio.<br>2. Understand the data type and format. | 1. Demonstrate the features of statistical programs such as Ms. Excel, SPSS, and R Studio.<br>2. Demonstrate import and export data to the statistical program | **Kriteria:** Student's participation in Class<br><br>**Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explain and demonstrate the statistical programs such as Ms.Excel, SPSS, and R Studio. Lecture explain the basic features such as import and export data and how to interpret the output results 2 X 50 | | **Materi:** Pengantar Biostatistik **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 10% |
| 3 | 1. Understand the basic concept of data visualization.<br>2. Able to visualize data to any graph such as bar plot, scatter plot, line plot, box plot, etc. | 1. Explain how to choose the most appropriate graph for our datasets.<br>2. Explain the different usage of each graph representing our dataset type.<br>3. Describe the common caveats you should avoid when making a graph. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%.<br><br>**Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explain the basic concept of data visualizations. Lecture demonstrate how to generate appropriate graph and followed by student. 2 X 50 | | **Materi:** Pengantar Biostatistik **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 5% |

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|---|---|---|---|---|---|---|---|
| **4** | 1.1. Understand the concept of descriptive statistics: Measurement of central tendency, measurement of spread, and frequency table. 2.2. Able to use statistical tools to generate descriptive statistics | 1. Explain the scope of descriptive statistics. 2. Explain how to measure central tendency (Mean, Median, and Mode) in single and grouped datasets. 3. Explain how to measure spread (Range, Standard Deviation, Variation, and IQR). 4. Explain how to make a frequency table. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explain the basic concept of descriptive statistics including measurement of central tendency and spread. Lecture lead the student to exercise to analyse the descriptive statistics based on given datasets. 3 X 50 | | **Materi:** Pengantar Biostatistik **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 5% |
| **5** | 1. Understand the concept of normal distribution, normality test, and student's t-test. 2. Able to use statistical tools to calculate normality test, and student's t-test. | 1. Explain the concept of normal distribution and normality test. 2. Explain the purpose of student's t-test 3. Explain the normality test procedure. 4. Explain the student t-test procedure in paired and unpaired datasets. 5. Practice using statistical program to perform normality test and student t-test. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explains the basic concept of normality test and student t-test and its application in biology and education research. 3 X 50 | | **Materi:** Uji Normalitas, Uji t **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 0% |
| **6** | 1. Understand the concept of simple linear regression. 2. Able to use statistical tools to perform simple linear regression. | 1. Explain the objective and procedure of simple linear regression. 2. Practice using statistical program to perform simple linear regression. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explains the basic concept of simple linear regression and its application in biology and education research. 3 X 50 | | **Materi:** Regresi Sederhana **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 10% |
| **7** | 1. Understand the concept of multiple regression. 2. Able to use statistical tools to perform multiple regression. | 1. Explain the objective and procedure performing multiple regression. 2. Menganalisis data dengan menggunakan regresi ganda 3. Menggunakan Excel dan SPSS untuk uji uji regresi ganda | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explains the basic concept of multiple regression and its application in biology and education research. 3 X 50 | | **Materi:** Regresi Berganda **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 0% |

| No | Kemampuan akhir | Indikator | Kriteria & Bentuk Penilaian | Metode Pembelajaran | | Materi & Pustaka | Bobot |
|---|---|---|---|---|---|---|---|
| **8** | Midterm Exam | | **Bentuk Penilaian** : Tes | -<br>3 X 50 | - | **Materi:** -<br>**Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 20% |
| **9** | 1. Understand the concept of analysis of covariance (ANCOVA).<br>2. Able to use statistical tools to perform analysis of covariance (ANCOVA). | 1. Explain the concept and objective of analysis of covariance.<br>2. Explain the procedure to perform analysis of covariance.<br>3. Practice using statistical tools to perform analysis of covariance to given datasets. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%.<br><br>**Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explains the basic concept of analysis of covariance (ANCOVA) and its application in biology and education research.<br>3 X 50 | - | **Materi:** Analisis Kovarians<br>**Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 10% |
| **10** | 1. Understand the concept of single-factor experimental design: Completely Randomized Design (CRD)<br>2. Able to use statistical tools to perform one-way analysis of variance (ANOVA) data from CRD. | 1. Design the experimental with single factor (CRD).<br>2. Analyze the collected dataset using analysis of variance (ANOVA).<br>3. Interpret the results of analysis.<br>4. Perform a post-hoc analysis and draw conclusions. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%.<br><br>**Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explains and leads the class's discussion about single-factor experimental design (CRD) in biology and education research.<br>3 X 50 | | **Materi:** Analisis varians 1-faktor (CRD)<br>**Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 10% |
| **11** | 1. Understand the concept of single-factor experimental design: Randomized Complete Block Design (RCBD) and Latin Square Design (LSD).<br>2. Able to use statistical tools to perform one-way analysis of variance (ANOVA) data from RCBD and LSD. | 1. Design the experimental with single factor RCBD and LSD for biology and education research.<br>2. Analyze datasets using analysis of variance (ANOVA)<br>3. Interpret the results of analysis.<br>4. Perform a post-hoc analysis and draw conclusions. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%.<br><br>**Bentuk Penilaian** : Praktik / Unjuk Kerja | Lecture explains and leads the class's discussion about single-factor experimental design (RCBD and LSD) in biology and education research.<br>3 X 50 | - | | 5% |

| 12 | 1.Understand the multiple-factor / factorial experimental design concept: Strip-plot and Split-plot design. 2.Able to use statistical tools to perform two-way analysis of variance (ANOVA) data from Strip-plot and Split-plot design. | 1.Distinguish the difference between Strip-plot and Split-plot experimental design. 2.Design the experimental with multiple factor (Strip-plot and Split-plot experimental design). 3.Analyze datasets using analysis of variance (ANOVA). 4.Interpret the results of analysis. 5.Perform a post-hoc analysis and draw conclusions. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Praktik / Unjuk Kerja | Lecture explains and leads the class's discussion about multiple factor experimental design (Strip-plot and Split-plot design) in biology and education research. 3 X 50 | - | **Materi:** Analisis varians 2-faktor (plot terpisah dan plot strip) **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 5% |
| 13 | 1.Understand the concept of non-parametric tests in statistics. 2.Understand the concept of the Wilcoxon signed-rank test. 3.Understand the concept of Spearman's Rank correlation coefficient. 4.Able to use statistical tools to perform non-parametric test in statistics | 1.Explain the kind of non parametric tests 2.Explain the requirement of Wilcoxon signed-rank test. 3.Practice to perform Wilcoxon signed-rank test using statistical programs. 4.Explain the requirement of Spearman's Rank correlation coefficient. 5.Practice to perform Spearman's Rank correlation coefficient using statistical programs. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif | Lecture explains and leads the class's discussion about non parametric test in biology and education research. 3 X 50 | | **Materi:** Analisis Wilcoxon **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 5% |
| 14 | 1.Understand the concept of chi-squared test. 2.Able to use statistical tools to perform chi-squared test. | 1.Compare the Chi-square test : Goodness of Fit & Contingency Table. 2.Practice Chi-square test : Goodness of Fit & Contingency Table using statistical programs. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif, Praktik / Unjuk Kerja | Lecture explains and leads the class's discussion about chi-squared test in biology and education research. 3 X 50 | - | **Materi:** Analisis Chi-Square **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 5% |

| 15 | 1. Understand the concept of the Kruskal-Wallis test and the Friedman test. 2. Able to use statistical tools to perform the Kruskal-Wallis test and the Friedman test . | 1. Compare the objective between Kruskal-Wallis test and the Friedman test. 2. Practice to perform Kruskal-Wallis test using statistical programs. 3. Practice to perform the Friedman test using statistical programs. | **Kriteria:** Individual Assignment with proportion weight of 30%; Midterm exam 20%; Student's participation during class discussion 20%; and Final exam 30%. **Bentuk Penilaian** : Aktifitas Partisipasif, Praktik / Unjuk Kerja | Lecture explains and leads the class's discussion about the Kruskal-Wallis test and the Friedman test biology and education research. 3 X 50 | | **Materi:** Analisis Crusscal Wallis dan tes Friedman **Pustaka:** *Hariani D, Ambarwati R, Purnama ER, 2019. Buku Ajar Mahasiswa: Biostatistika dan Biokomputer. Surabaya: Unesa Press* | 0% |
| 16 | | | **Bentuk Penilaian** : Penilaian Hasil Project / Penilaian Produk | Final Exam 2x50 | | | 10% |

**Rekap Persentase Evaluasi : Project Based Learning**

| No | Evaluasi | Persentase |
|---|---|---|
| 1. | Aktifitas Partisipasif | 57.5% |
| 2. | Penilaian Hasil Project / Penilaian Produk | 10% |
| 3. | Praktik / Unjuk Kerja | 12.5% |
| 4. | Tes | 20% |
| | | 100% |

**Catatan**

1. **Capaian Pembelajaran Lulusan PRODI (CPL-PRODI)** adalah kemampuan yang dimiliki oleh setiap lulusan PRODI yang merupakan internalisasi dari sikap, penguasaan pengetahuan dan ketrampilan sesuai dengan jenjang prodinya yang diperoleh melalui proses pembelajaran.
2. **CPL yang dibebankan pada mata kuliah** adalah beberapa capaian pembelajaran lulusan program studi (CPL-PRODI) yang digunakan untuk pembentukan/pengembangan sebuah mata kuliah yang terdiri dari aspek sikap, ketrampulan umum, ketrampilan khusus dan pengetahuan.
3. **CP Mata kuliah (CPMK)** adalah kemampuan yang dijabarkan secara spesifik dari CPL yang dibebankan pada mata kuliah, dan bersifat spesifik terhadap bahan kajian atau materi pembelajaran mata kuliah tersebut.
4. **Sub-CP Mata kuliah (Sub-CPMK)** adalah kemampuan yang dijabarkan secara spesifik dari CPMK yang dapat diukur atau diamati dan merupakan kemampuan akhir yang direncanakan pada tiap tahap pembelajaran, dan bersifat spesifik terhadap materi pembelajaran mata kuliah tersebut.
5. **Indikator penilaian** kemampuan dalam proses maupun hasil belajar mahasiswa adalah pernyataan spesifik dan terukur yang mengidentifikasi kemampuan atau kinerja hasil belajar mahasiswa yang disertai bukti-bukti.
6. **Kreteria Penilaian** adalah patokan yang digunakan sebagai ukuran atau tolok ukur ketercapaian pembelajaran dalam penilaian berdasarkan indikator-indikator yang telah ditetapkan. Kreteria penilaian merupakan pedoman bagi penilai agar penilaian konsisten dan tidak bias. Kreteria dapat berupa kuantitatif ataupun kualitatif.
7. **Bentuk penilaian:** tes dan non-tes.
8. **Bentuk pembelajaran:** Kuliah, Responsi, Tutorial, Seminar atau yang setara, Praktikum, Praktik Studio, Praktik Bengkel, Praktik Lapangan, Penelitian, Pengabdian Kepada Masyarakat dan/atau bentuk pembelajaran lain yang setara.
9. **Metode Pembelajaran:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, dan metode lainnya yg setara.
10. **Materi Pembelajaran** adalah rincian atau uraian dari bahan kajian yg dapat disajikan dalam bentuk beberapa pokok dan sub-pokok bahasan.
11. **Bobot penilaian** adalah prosentasi penilaian terhadap setiap pencapaian sub-CPMK yang besarnya proposional dengan tingkat kesulitan pencapaian sub-CPMK tsb., dan totalnya 100%.
12. TM=Tatap Muka, PT=Penugasan terstruktur, BM=Belajar mandiri.

RPS ini telah divalidasi pada tanggal

Koordinator Program Studi S1
Pendidikan Biologi

Dr. Rinie Pratiwi Puspitawati,
M.Si.
NIDN 0012016605

UPM Program Studi S1
Pendidikan Biologi

NIDN

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