

MODULE HANDBOOK  
**PHYSICS**



**BACHELOR DEGREE PROGRAM  
DEPARTMENT OF  
MATHEMATICS  
FACULTY OF SCIENCE AND DATA ANALYTICS  
INSTITUT TEKNOLOGI SEPULUH NOPEMBER**

## ENDORSEMENT PAGE



### MODULE HANDBOOK PHYSICS DEPARTMENT OF MATHEMATICS 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>                                  | Dr.Sri Yani<br>Purwaningsih                 | Dosen<br><i>Lecturer</i>                                    |                                 | March 28, 2019         |
| Pemeriksa dan<br>Pengendalian<br><i>Review and<br/>Control</i> | Ir. Tutug<br>Dhanardono, M.T                | Tim kurikulum<br><i>Curriculum<br/>team</i>                 |                                 | April 15, 2019         |
| Persetujuan<br><i>Approval</i>                                 |                                             | Koordinator<br>RMK<br><i>Course Cluster<br/>Coordinator</i> |                                 | July 17, 2019          |
| Penetapan<br><i>Determination</i>                              | Subchan, S.Si,<br>M.Sc, Ph.D                | Kepala<br>Departemen<br><i>Head of<br/>Department</i>       |                                 | July 30, 2019          |

# MODULE HANDBOOK

## PHYSICS

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Module name                                           | <b>Physics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |
| Module level                                          | Undergraduate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |
| Code                                                  | SF184901                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |
| Course (if applicable)                                | Physics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| Semester                                              | 1 <sup>st</sup> semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |
| Person responsible for the module                     | Dr.Sri Yani Purwaningsih, M.Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |
| Lecturer                                              | Dr.Sri Yani Purwaningsih, M.Si; Ir. Tutug Dhanardono, M.T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |
| Language                                              | Bahasa Indonesia and English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |
| Relation to curriculum                                | Undergraduate degree program, <b>mandatory</b> , 1 <sup>st</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                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |
| Learning outcomes and their corresponding PLOs        | CLO.1 Understand the physical quantities and unit, including the characteristics of scalar and vector quantities<br>CLO.2 Understand the definition of straight and curved motion in graphical and mathematical including its application<br>CLO.3 Understand the basic principle of Newton Laws and the types of Force including its application<br>CLO.4 Understand the concept of Work and Energy, mechanic energy, The principle of conservation of mechanical energy and its application<br>CLO.5 Apply the concept of impulses and momentum, conservation of momentum, collisions and their applications<br>CLO.6 Understand the principles of rigid body rotational and translational motion including its application<br>CLO.7 Understand the concept of rigid body equilibrium and its application | PLO.1 |

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                             | <p>CLO.8 Understand the mechanics of objects transition and elasticity including its application</p> <p>CLO.9 Understand simple harmonic oscillator, superposition of two vibrations and their application</p> <p>CLO.10 Understand the concepts of hydrostatics and hydrodynamics and their application</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Content                                                     | <p>In this course, the students will learn to understand the laws of basic physics, Particle kinematics; Particle dynamics; Work and energy; Rotational motion; Vibration and Fluid Mechanics, through simple mathematical explanations and apply the concept including analyzing the material in practicum. The practicum includes physical pendulum, mathematical pendulum, spring constant, fluid viscosity, projectile motion, friction coefficient, and moment of inertia.</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                                                | <p>Main references:</p> <ol style="list-style-type: none"> <li>1. Halliday, Resnic, Jearl Walker, 'Fundamental of Physics'. John Wiley and Sons, 10th ed, New York, 2014</li> <li>2. Douglas C. Giancoli, 'Physics for Scientists and Engineers', Pearson Education, 4th ed, London, 2014</li> <li>3. Tim Dosen Fisika, "Fisika 1 Mekanika &amp; Termodinamika untuk Sains dan Teknik", Fisika FIAITS, 2018</li> <li>4. -, "Petunjuk Praktikum Fisika Dasar", Fisika, MIPA-ITS</li> </ol> <p>Supporting references:</p> <ol style="list-style-type: none"> <li>1. Sears &amp; Zemanky, "University Physics", Pearson Education, 14th ed, USA, 2016</li> <li>2. Tipler, PA, 'Physics for Scientists and Engineers', 6th ed, W.H. Freeman and Co, New York, 2008</li> </ol> |  |

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|-------|------------------|------------------------|
|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

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|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bahan Kajian           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>Study Materials</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CPL yang dibebankan MK | CPL 1. Mahasiswa mampu mengidentifikasi dan menjelaskan pondasi matematika yang meliputi murni, terapan dan dasar-dasar komputasi<br><br><i>PLO1. Students are able to identify and explain foundations of mathematics that include pure, applied, and the basic of computing</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>PLO</i>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CP-MK<br><i>CLO</i>    | CLO.1 Understand the physical quantities and unit, including the characteristics of scalar and vector quantities<br>CLO.2 Understand the definition of straight and curved motion in graphical and mathematical including its application<br>CLO.3 Understand the basic principle of Newton Laws and the types of Force including its application<br>CLO.4 Understand the concept of Work and Energy, mechanic energy, The principle of conservation of mechanical energy and its application<br>CLO.5 Apply the concept of impulses and momentum, conservation of momentum, collisions and their applications<br>CLO.6 Understand the principles of rigid body rotational and translational motion including its application<br>CLO.7 Understand the concept of rigid body equilibrium and its application<br>CLO.8 Understand the mechanics of objects transition and elasticity including its application<br>CLO.9 Understand simple harmonic oscillator, superposition of two vibrations and their application<br>CLO.10 Understand the concepts of hydrostatics and hydrodynamics and their application |

| Pertemuan<br><i>Meeting</i> | Kemampuan Akhir 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> |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| 1,2                         | Mahasiswa mampu menjelaskan Kinematika dan Dinamika partikel:<br><i>The students are able to explain the particle kinematics and Dynamics</i> | Kinematika dan Dinamika partikel:<br><i>Particle kinematics and Dynamics</i> | Kontrak belajar, Kuliah Klasikal, ILE<br><i>Course Agreement, Lecture, ILE</i> | 4 x 50 menit<br><i>4 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion, Assignment</i> | Mahasiswa mampu menjelaskan Kinematika dan Dinamika partikel:<br><i>The students are able to explain the particle kinematics and Dynamics</i> | 3%                                |

|       |                                                                                                                                                                       |                                                                                                                                                                                                             |                                             |                                       |                                                 |                                                                                                                                                                                                                                       |            |
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| 3,4,5 | Mampu menjelaskan Kerja dan energi: konsep kerja, energi kinetik, energi potensial (gravitasi dan pegas), hukum kekekalan energi mekanik, impuls, momentum, tumbukan; | Kerja dan energi: konsep kerja, energi kinetik, energi potensial (gravitasi dan pegas), hukum kekekalan energy mekanik, impuls, momentum, tumbukan;<br><i>Work and energy: the concept of work, kinetic</i> | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i> | 2 x 50 menit<br><i>2 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion, Assignment</i> | Mampu menjelaskan Kerja dan energi: konsep kerja, energi kinetik, energi potensial (gravitasi dan pegas), hukum kekekalan energi mekanik, impuls, momentum, tumbukan;<br><i>Able to explain work and energy: the concept of work,</i> | <b>3 %</b> |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|

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|-------|------------------|------------------------|
|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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>Able to explain work and energy: the concept of work, kinetic energy, potential energy (gravity and spring), the law of conservation of mechanical energy, impulse, momentum, collision</i>                                                                                                                                                                                                | <i>energy, potential energy (gravity and spring), the law of conservation of mechanical energy, impulse, momentum, collision</i>                                                                                                                                                                                                                                  |                                                   |                                       |                                                 | <i>kinetic energy, potential energy (gravity and spring), the law of conservation of mechanical energy, impulse, momentum, collision</i>                                                                                                                                                                                                                                                                                                                         |                                      |
| 6,7,8,9                          | Memahami Dinamika rotasi: pusat massa, momen gaya (torsi), kesetimbangan momen gaya, momen inersia, energi kinetik rotasi, gerak menggelinding, hukum kekekalan energi (translasi dan rotasi)<br><i>Understand the rotational dynamics: the center of mass, force moment (torque), force moment equilibrium, the moment of inertia, rotational kinetic energy, rolling motion, the energy</i> | Dinamika rotasi: pusat massa, momen gaya (torsi), kesetimbangan momen gaya, momen inersia, energi kinetik rotasi, gerak menggelinding, hukum kekekalan energi (translasi dan rotasi)<br><i>Rotational dynamics: the center of mass, force moment (torque), force moment equilibrium, moment of inertia, rotational kinetic energy, rolling motion, the energy</i> | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion, Assignment</i> | Mahasiswa memahami Dinamika rotasi: pusat massa, momen gaya (torsi), kesetimbangan momen gaya, momen inersia, energi kinetik rotasi, gerak menggelinding, hukum kekekalan energi (translasi dan rotasi)<br><i>The students understand the rotational dynamics: the center of mass, force moment (torque), force moment equilibrium, the moment of inertia, rotational kinetic energy, rolling motion, the energy conservation law (translation and rotation)</i> | <b>3 %</b>                           |

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|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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>conservation law<br/>(translation and rotation)</i>                                                                                                                                                                                                                                                                                                         | <i>conservation law<br/>(translation and rotation)</i>                                                                                                                                                                                                                                                                        |                                                   |                                       |                                                 |                                                                                                                                                                                                                                                                                                                   |                                      |
| 10                               |                                                                                                                                                                                                                                                                                                                                                                | <b>QUIZ 1</b>                                                                                                                                                                                                                                                                                                                 |                                                   | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                                 |                                                                                                                                                                                                                                                                                                                   | <b>10%</b>                           |
| 11,12                            | Mahasiswa memahami<br>Getaran: gerak harmonis<br>sederhana, energi gerak<br>harmonis sederhana,<br>bandul matematis,<br>bandul fisis, bandul<br>Puntir<br><i>The students understand<br/>the vibration: simple<br/>harmonic motion, the<br/>energy of simple<br/>harmonic motion,<br/>mathematical pendulum,<br/>physical pendulum,<br/>torsional pendulum</i> | <ul style="list-style-type: none"> <li>• Getaran: gerak harmonis sederhana, energi gerak harmonis sederhana, bandul matematis, bandul fisis, bandul puntir</li> <li>• <i>Vibration: simple harmonic motion, the energy of simple harmonic motion, mathematical pendulum, physical pendulum, torsional pendulum</i></li> </ul> |                                                   | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                                 | Mahasiswa memahami getaran: gerak harmonis sederhana, energi gerak harmonis sederhana, bandul matematis, bandul fisis, bandul puntir,<br><i>The students understand the vibration: simple harmonic motion, the energy of simple harmonic motion, mathematical pendulum, physical pendulum, torsional pendulum</i> |                                      |
| 13,14<br><br>minggu ke 7)        | Memahami Mekanika fluida: tekanan hidrostatika, prinsip Pascal, prinsip Archimedes, persamaan kontinuitas, persamaan Bernoulli,                                                                                                                                                                                                                                | Mekanika fluida: tekanan hidrostatika, prinsip Pascal, prinsip Archimedes, persamaan kontinuitas, persamaan Bernoulli<br><i>Fluid mechanics: hydrostatic pressure,</i>                                                                                                                                                        | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 4 x 50 menit<br><i>4 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion, Assignment</i> | Mekanika fluida: tekanan hidrostatika, prinsip Pascal, prinsip Archimedes, persamaan kontinuitas, persamaan Bernoulli,<br><i>Fluid mechanics: hydrostatic pressure, Pascal's principle, Archimedes' principle, surface</i>                                                                                        | <b>3%</b>                            |



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|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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>Understand the fluid mechanics: hydrostatic pressure, Pascal's principle, Archimedes' principle, surface tension, continuity equation, Bernoulli's equation</i>                                                                                                | <i>Pascal's principle, Archimedes' principle, surface tension, continuity equation, Bernoulli's equation</i>                                                                                                       |                                                   |                                       |                                                 | <i>tension, continuity equation, Bernoulli's equation</i>                                                                                                                                                                                                                           |                                      |
| 17,18<br>Minggu<br>ke 9          | Mahasiswa memahami Medan Listrik :Hukum Coulomb; kuat medan listrik, perhitungan kuat medan listrik;<br><i>The students understand the Electric Field: Coulomb's Law; the strength of an electric field, the calculation of the strength of an electric field</i> | Medan Listrik: Hukum Coulomb; kuat medan listrik, perhitungan kuat medan listrik;<br><i>Electric Field: Coulomb's Law; the strength of an electric field, the calculation of the strength of an electric field</i> | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 4 x 50 menit<br><i>4 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion, Assignment</i> | Mahasiswa mampu menjelaskan Medan Listrik :Hukum Coulomb; kuat medan listrik, perhitungan kuat medan listrik;<br><i>The students are able to explain the Electric Field: Coulomb's Law; the strength of an electric field, the calculation of the strength of an electric field</i> | <b>3</b>                             |
| 19,20,<br>21,22                  | Mahasiswa memahmi Potensial listrik dan Kapasitor: energi potensial, beda potensial listrik, perhitungan potensial listrik, Kapasitansi, rangkaian kapasitor;                                                                                                     | Potensial listrik dan Kapasitor: energi potensial, beda potensial listrik, perhitungan potensial listrik, Kapasitansi, rangkaian kapasitor, energi kapasitor;                                                      | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion, Assignment</i> | Mahasiswa mampu menjelaskan Potensial listrik dan Kapasitor: energi potensial, beda potensial listrik, perhitungan potensial listrik,                                                                                                                                               | <b>3</b>                             |

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|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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> |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|                                  | kapasitor, energi<br>kapasitor;<br><i>The students understand<br/>the electric potential and<br/>capacitance: potential<br/>energy, electric potential<br/>difference, electric<br/>potential calculation,<br/>Capacitance, capacitor<br/>circuit, capacitor energy</i>                                                                                   | <i>Electric potential and<br/>capacitance: potential<br/>energy, electric potential<br/>difference, electric potential<br/>calculation, Capacitance,<br/>capacitor circuit, capacitor<br/>energy</i>                                                                                                                                         |                                                   |                                       |                                                     | Kapasitansi, rangkaian kapasitor,<br>energi kapasitor;<br><i>The students are able to explain<br/>the electric potential and<br/>capacitance: potential energy,<br/>electric potential difference,<br/>electric potential calculation,<br/>Capacitance, capacitor circuit,<br/>capacitor energy</i>                                                                                                        |                                      |
| 23, 24                           | Mahasiswa memahami<br>Arus listrik dan Resistor:<br>arus listrik, hukum Ohm,<br>rangkaian resistor, energi<br>dan daya listrik;<br>Rangkaian arus searah,<br>hukum Kirchoff<br><i>The students understand<br/>the electric currents and<br/>resistors: electric<br/>currents, Ohm's law,<br/>resistor circuits, energy<br/>and electric power; direct</i> | Arus listrik dan Resistor:<br>arus listrik, hukum Ohm,<br>rangkaian resistor,<br>energi dan daya listrik;<br>Rangkaian arus searah,<br>hukum Kirchoff<br><i>Electric currents and<br/>resistors: electric<br/>currents, Ohm's law,<br/>resistor circuits, energy<br/>and electric power; direct<br/>current circuits, Kirchoff's<br/>law</i> | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> | Diskusi, Tugas<br><i>Discussion,<br/>Assignment</i> | Mahasiswa mampu menjelaskan<br>Arus listrik dan Resistor: arus<br>listrik, hukum Ohm, rangkaian<br>resistor, energi dan daya listrik;<br>Rangkaian arus searah, hukum<br>Kirchoff,<br><i>The students are able to explain<br/>the electric currents and resistors:<br/>electric currents, Ohm's law,<br/>resistor circuits, energy and<br/>electric power; direct current<br/>circuits, Kirchoff's law</i> | <b>3 %</b>                           |

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|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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>current circuits, Kirchoff's law</i>                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                        |                                                   |                                       |                                           |                                                                                                                                                                                                                                                                                                                                                                         |                                      |
| 25                               |                                                                                                                                                                                                                                                                                                                               | <b>QUIZ II</b>                                                                                                                                                                                                                                                                                         |                                                   | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                           |                                                                                                                                                                                                                                                                                                                                                                         | <b>10%</b>                           |
| 26<br>Minggu<br>ke 13            | Memahami Arus listrik dan Resistor: arus listrik, hukum Ohm, rangkaian resistor, energi dan daya listrik; Rangkaian arus searah, hukum Kirchoff<br><i>Understand the electric currents and resistors: electric currents, Ohm's law, resistor circuits, energy and electric power; direct current circuits, Kirchoff's law</i> | Arus listrik dan Resistor: arus listrik, hukum Ohm, rangkaian resistor, energi dan daya listrik; Rangkaian arus searah, hukum Kirchoff,<br><i>Electric currents and resistors: electric currents, Ohm's law, resistor circuits, energy and electric power; direct current circuits, Kirchoff's law</i> | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                           | Mahasiswa mampu menjelaskan Arus listrik dan Resistor: arus listrik, hukum Ohm, rangkaian resistor, energi dan daya listrik; Rangkaian arus searah, hukum Kirchoff,<br><i>The students are able to explain the electric currents and resistors: electric currents, Ohm's law, resistor circuits, energy and electric power; direct current circuits, Kirchoff's law</i> |                                      |
| 27,28                            | Memahami Hukum Faraday, Hukum Lenz, GGL induksi, Induktansi diri dan induktansi gandeng; energi pada Inductor                                                                                                                                                                                                                 | Hukum Faraday, Hukum Lenz, GGL induksi, Induktansi diri dan induktansi gandeng; energi pada induktor;<br><i>Faraday's law, Lenz's law, induced EMF, self inductance and mutual</i>                                                                                                                     | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                           | Mahasiswa mampu menjelaskan Hukum Faraday, Hukum Lenz, GGL induksi, Induktansi diri dan induktansi gandeng; energi pada inductor                                                                                                                                                                                                                                        | <b>3</b>                             |

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|-------|------------------|------------------------|
|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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>Understand the Faraday's law, Lenz's law, induced EMF, self inductance and mutual inductance; energy in the inductor</i>                                                                                                                  | <i>inductance; energy in the inductor</i>                                                                                                                                                                             |                                                   |                                       |                                           | <i>The students are able to explain the Faraday's law, Lenz's law, induced EMF, self inductance and mutual inductance; energy in the inductor</i>                                                                                                                                                     |                                      |
| 29                               | Memahami Hukum Faraday, Hukum Lenz, GGL induksi, Induktansi diri dan induktansi gandeng; energi pada induktor<br><i>Understand the Faraday's law, Lenz's law, induced EMF, self inductance and mutual inductance; energy in the inductor</i> | Hukum Faraday, Hukum Lenz, GGL induksi, Induktansi diri dan induktansi gandeng; energi pada induktor;<br><i>Faraday's law, Lenz's law, induced EMF, self inductance and mutual inductance; energy in the inductor</i> | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                           | Mahasiswa mampu menjelaskan<br>Memahami<br>Hukum Faraday, Hukum Lenz, GGL induksi, Induktansi diri dan induktansi gandeng; energi pada induktor;<br><i>The students are able to explain the Faraday's law, Lenz's law, induced EMF, self inductance and mutual inductance; energy in the inductor</i> | <b>3</b>                             |
| 30                               | Memahami Arus bolak-balik: Impedansi, rangkaian R-L-C, Daya<br><i>Understand the alternating current: impedance, R-L-C circuit, power</i>                                                                                                    | Arus bolak-balik: Impedansi, rangkaian R-L-C, Daya.<br><i>Alternating current: impedance, R-L-C circuit, power</i>                                                                                                    | Kuliah Klasikal, ILE<br><i>Lecture, ILE</i>       | 2 x 50 menit<br><i>2 x 50 minutes</i> |                                           | Mahasiswa mampu menjelaskan<br>Arus bolak-balik: Impedansi, rangkaian R-L-C, Daya.<br><i>The students are able to explain the alternating current: impedance, R-L-C circuit, power</i>                                                                                                                | <b>3</b>                             |

|       |                  |                        |
|-------|------------------|------------------------|
|       | Program Studi    | (Semua Program Studi)  |
|       | Mata Kuliah      | Fisika                 |
|       | Kode Mata Kuliah | SF184101               |
|       | Semester         | I                      |
|       | SKS              | 3 sks                  |
| RP-S1 | Dosen Pengampu   | Tim Dosen Fisika Dasar |

| 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> |
|----------------------------------|------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------|
| 31,32                            | EAS<br>FINAL EXAM                                    |                                                                        |                                                   |                                      |                                           |                                                                               | 20%                                  |

PUSTAKA/*REFERENCES*: -