UNESA	**Universitas Negeri Surabaya** **Fakultas Matematika dan Ilmu Pengetahuan Alam** **Program Studi S1 Fisika**	**Kode Dokumen**

RENCANA PEMBELAJARAN SEMESTER

MATA KULIAH (MK)	KODE	Rumpun MK	BOBOT (sks)			SEMESTER	Tgl Penyusunan
Fisika Dasar II	4520104057	Mata Kuliah Wajib Program Studi	T=3	P=1	ECTS=6.36	2	26 Juli 2023

OTORISASI	Pengembang RPS	Koordinator RMK	Koordinator Program Studi
	Nugrahani Primary Putri, M.Si.	Dr. Binar Kurnia Prahani, M.Pd.	Prof. Dr. Munasir, S.Si., M.Si.

Model Pembelajaran	**Project Based Learning**	
Capaian Pembelajaran (CP)	**CPL-PRODI yang dibebankan pada MK**	
	CPL-5	Mampu menguasai dan mendemonstrasikan prinsip-prinsip dan teori Fisika Klasik dan Modern
	CPL-7	Menguasai pengetahuan tentang teknologi yang berdasarkan Fisika dan penerapannya.
	Capaian Pembelajaran Mata Kuliah (CPMK)	
	CPMK - 1	Mastering structured concepts of Classical, especially on electricity, magnetism, optics, and Modern Physics.
	CPMK - 2	Mastering mathematical aspects as an effective tool for understanding physics better through physical modelling.
	CPMK - 3	Able to design and conduct practicums, especially on the topics of electricity, magnetism and optics.
	CPMK - 4	Able to communicate their ideas in the form of a written report and presenting the results of practicum orally.

Matrik CPL - CPMK

CPMK	CPL-5	CPL-7
CPMK-1		
CPMK-2		
CPMK-3		
CPMK-4		

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																

Deskripsi Singkat MK	MK Fisika Dasar 2 ini terdiri dari dua macam ilmu Fisika, yaitu Listrik Magnet dan Optik. Pembahasan akan mencakup Medan listrik, Hukum Gauss, Potensial Listrik, Kapasitansi dan Dielektrik, Arus dan Hambatan, Rangkaian arus searah, Medan magnet, Sumber medan magnet, Hukum Faraday, Induktansi, Rangkaian arus bolak-balik, Gelombang elektromagnetik. Sedangkan untuk materi Optik, terdiri dari optik sebagai cahaya (optika geometri), dilanjutkan dengan interaksi antara cahaya dengan materi, yaitu refleksi, refraksi, interferensi gelombang cahaya, difraksi dan polarisasi gelombang.
Pustaka	**Utama :**

1. Bueche, F.J., 2000, Schaum&rsquos Outline of College Physics, McGraw-Hill.
2. Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.
3. Halliday & Resnick, 1997, Fisika Jilid 1, Erlangga.

Pendukung :

Dosen Pengampu	Dr. Zainul Arifin Imam Supardi, M.Si. Prof. Tjipto Prastowo, Ph.D. Dr. Diah Hari Kusumawati, S.Si., M.Si. Dr. Nugrahani Primary Putri, S.Si., M.Si. Lydia Rohmawati, S.Si., M.Si. Dr. Eng. Evi Suaebah, M.Si., M.Sc. Arie Realita, M.Si. Dr. Fitriana, S.Si. Muhammad Nurul Fahmi, S.Si., M.Si.

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	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics	Mahasiswa mampu menjelaskan konsep Hukum Coulomb dan Medan Listrik	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio	Ceramah, diskusi dan penugasanContextual Learning Discussions Q & A 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 1: electric field, Coulomb interaction, and Gauss law. 2. Introduction of electrical measuring instruments **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%
2	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics	Mahasiswa mampu menjelaskan konsep Hukum Coulomb dan Medan Listrik	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio	Ceramah, diskusi dan penugasanContextual Learning Discussions Q & A 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 1: electric field, Coulomb interaction, and Gauss law. 2. Introduction of electrical measuring instruments **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%
3	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics 3.3. Being able to design and conduct practicums with the topics of electricity.	Mahasiswa mampu menganalisis konsep potensial listrik	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio, Penilaian Praktikum	Contextual Learning Discussions Q & A 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 2: electric potential, electric potential energy, conservation of energy, capacitance and dielectrics. **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%

4	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics 3.3. Being able to design and conduct practicums with the topics of electricity.	Students are able to explain the concept of electric current, and analyze series and parallel circuit.	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio, Penilaian Praktikum	Contextual Learning Discussions Q & A 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 2: electric potential, electric potential energy, conservation of energy, capacitance and dielectrics. **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%
5	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics 3.3. Being able to design and conduct practicums with the topics of electricity.	Students are able to explain the concept of electric current, and analyze series and parallel circuit.	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio, Penilaian Praktikum	Contextual Learning Discussions Q & A 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 2: electric potential, electric potential energy, conservation of energy, capacitance and dielectrics. **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%
6	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics 3.3. Being able to design and conduct practicums with the topics of electricity. 4.4. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	Students are able to analyze the concept of alternating current and RLC circuit.	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio, Penilaian Praktikum	Contextual Learning Discussions Q & A 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 2: electric potential, electric potential energy, conservation of energy, capacitance and dielectrics. **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%

7	1.1. Being able to understand concepts of electricity. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics 3.3. Being able to design and conduct practicums with the topics of electricity. 4.4. Being able to design and conduct practicums with the topics of magnetism. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	Students are able to analyze the concept of alternating current and RLC circuit.	**Kriteria:** Students will get full marks if they meet the assessment indicators **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio, Penilaian Praktikum	Contextual Learning Discussions Q & A Practicum 3 x 50 menit	Contextual Learning Discussions Q & A 3 x 50 menit	**Materi:** 1. Concepts of electricity – part 2: electric potential, electric potential energy, conservation of energy, capacitance and dielectrics. **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%
8		Mahasiswa dapat menyelesaikan soal terkait listrik dan magnet	**Kriteria:** Mahasiswa akan mendapat nilai maksimal jika dapat memenuhi indikator penilaian **Bentuk Penilaian** : Tes	UTS 2 x 50	UTS 2 x 50	**Materi:** Ch 15-21 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	20%
9	1.1. Being able to understand concepts of magnetism 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	Student can explain the concepts of electromagnetic waves.	**Kriteria:** Nilai penuh akan diberikan kepada mahasiswa apabila semua soal dijawab dengan benar **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio, Praktik / Unjuk Kerja	Ceramah, diskusi, praktikum 4 X 50	Ceramah, diskusi, praktikum 4 x 50	**Materi:** Ch 21 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	0%
10	1.1. Being able to understand concepts of optics. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to design and conduct practicums with the topics of optics. 4.4. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	1.Student can explain the reflection and refraction process at mirror and lenses. 2.Student can explain the principal of optical devices.	**Kriteria:** Nilai penuh akan diberikan kepada mahasiswa apabila semua soal dijawab dengan benar **Bentuk Penilaian** : Aktifitas Partisipasif	Ceramah, diskusi, praktikum 4 X 50	Ceramah, diskusi, praktikum 4 x 50	**Materi:** Ch 22 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	0%

11	1.1. Being able to understand concepts of optics. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to design and conduct practicums with the topics of optics. 4.4. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	1.Student can explain the reflection and refraction process at mirror and lenses. 2.Student can explain the principal of optical devices.	**Kriteria:** Nilai penuh akan diberikan kepada mahasiswa apabila semua soal dijawab dengan benar **Bentuk Penilaian** : Aktifitas Partisipasif, Praktik / Unjuk Kerja	Ceramah, diskusi, praktikum 4 X 50	Ceramah, diskusi, praktikum 4 x 50	**Materi:** Ch 23 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	0%
12	1.1. Being able to understand concepts of optics. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to design and conduct practicums with the topics of optics. 4.4. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	1.Student can explain the reflection and refraction process at mirror and lenses. 2.Student can explain the principal of optical devices.	**Kriteria:** Nilai penuh akan diberikan kepada mahasiswa apabila semua soal dijawab dengan benar **Bentuk Penilaian** : Aktifitas Partisipasif, Praktik / Unjuk Kerja	Ceramah, diskusi, praktikum 4 X 50	Ceramah, diskusi, praktikum 4 x 50	**Materi:** Ch 24-25 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	5%
13	1.1. Being able to understand concepts of modern physics. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	1.Student can understand the principle of relativity and quantum physics 2.Student can understand the principle of atomic and nuclear physics.	**Kriteria:** Mahasiswa akan mendapatkan nilai penuh jika memenuhi indikator penilaian **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio	Ceramah, diskusi, pemberian tugas 4 X 50	Ceramah, diskusi, pemberian tugas 4 x 50	**Materi:** Ch 26 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	3%
14	1.1. Being able to understand concepts of modern physics. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	1.Student can understand the principle of relativity and quantum physics 2.Student can understand the principle of atomic and nuclear physics.	**Kriteria:** Mahasiswa akan mendapatkan nilai penuh jika memenuhi indikator penilaian **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio	Ceramah, diskusi, pemberian tugas 4 X 50	Ceramah, diskusi, pemberian tugas 4 x 50	**Materi:** Ch 27 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	3%

15	1.1. Being able to understand concepts of modern physics. 2.2. Being able to formulate a electrical, magnetism, optics and modern physics system using mathematics. 3.3. Being able to communicate their ideas in the form of a written report and presenting the results of practicum orally.	1.Student can understand the principle of relativity and quantum physics 2.Student can understand the principle of atomic and nuclear physics.	**Kriteria:** Mahasiswa akan mendapatkan nilai penuh jika memenuhi indikator penilaian **Bentuk Penilaian** : Aktifitas Partisipasif, Penilaian Portofolio	Ceramah, diskusi, pemberian tugas 4 X 50	Ceramah, diskusi, pemberian tugas 4 x 50	**Materi:** Ch 28-29 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	3%
16	Mahasiswa dapat menggunakan konsep optik dan fisika modern untuk menyelesaikan permasalahan fisika.	Mahasiswa dapat menyelesaikan soal terkait optik dan fisika modern	**Kriteria:** Mahasiswa mendapatkan nilai maksimal jika memenuhi indikator penilaian **Bentuk Penilaian** : Tes	UAS 2 x 50	UAS 2 x 50	**Materi:** Ch 22-29 **Pustaka:** *Serway, R.A., and Jewett, J.W., 2010, Physics for Scientists and Engineers with Modern Physics, SalembaTeknika.*	30%

Rekap Persentase Evaluasi : Project Based Learning

No	Evaluasi	Persentase
1.	Aktifitas Partisipasif	20.35%
2.	Penilaian Portofolio	17.85%
3.	Penilaian Praktikum	8.35%
4.	Praktik / Unjuk Kerja	2.5%
5.	Tes	50%
		99.05%

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-CPMK 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.