|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **UNIVERSITAS SUMATERA UTARA (USU)**  **FAKULTAS TEKNIK**  **DEPARTEMEN TEKNIK ELEKTRO** | | | | | | | | **Kode Dokumen** |
| **RENCANA PEMBELAJARAN SEMESTER** | | | | | | | | | |
| **MATA KULIAH (MK)** | | | **KODE** | **Rumpun MK** | **BOBOT (sks)** | | **SEMESTER** | **Tgl Penyusunan** | |
| **Medan Elektromagnetik 2** | | | TEE3103 |  | **2** |  |  | 7 AGUSTUS 2022 | |
| **OTORISASI / PENGESAHAN** | | | **Dosen Pengembang RPS** | | **Koordinator RMK** | | **Ka Prodi** | | |
| Ir. Hendra Zulkarnain, MT | | Ir. Hendra Zulkarnain, MT | | Suherman, ST., M.Comp., Ph.D | | |
| **Capaian Pembelajaran** | | **CPL-PRODI yang dibebankan pada MK** | | |  | | | | |
| CPL-1 | Mampu menerapkan pengetahuan matematika, ilmu pengetahuan alam/atau material, teknologi informasi dan kerekayasaan untuk mendapatkan pemahaman menyeluruh tentang prinsip-prinsip Teknik Elektro. | | | | | | |
| CPL-2 | Mampu mendesain komponen, sistem dan/atau proses untuk memenuhi kebutuhan yang diharapkan oleh masyarakat dengan dihadapkan pada batasan realistik yang meliputi aspek hukum, ekonomi, lingkungan, sosial, politik, kesehatan dan keselamatan, keberlanjutan. | | | | | | |
| CPL-3 | Mampu mendesain eksperimen laboratorium dan/atau lapangan serta menganalisis dan mengartikan data untuk memperkuat penilaian teknik khususnya dalam bidang Teknik Elektro. | | | | | | |
| CPL-4 | Mampu menyelesaikan permasalahan teknik khususnya dalam bidang Teknik Elektro secara bertanggungjawab dan memenuhi etika profesi. | | | | | | |
| CPL-5 | Mampu menerapkan metode, keterampilan dan perangkat teknik modern yang diperlukan untuk praktek profesi Teknik Elektro. | | | | | | |
| CPL-6 | Mampu berkomunikasi secara efektif, baik lisan maupun tulisan. | | | | | | |
| CPL-7 | Mampu mengevaluasi tugas-tugas dalam batasan yang ada secara disiplin dan menyeluruh. | | | | | | |
| CPL-8 | Mampu untuk bekerja dalam tim lintas disiplin dan multikultural serta global internasional. | | | | | | |
| CPL-9 | Mampu untuk bertanggung jawab kepada masyarakat dan mematuhi etika profesi dalam menyelesaikan permasalahan Teknik Elektro. | | | | | | |
| CPL-10 | Memiliki kapasitas pembelajaran sepanjang hayat termasuk akses pengetahuan yang relevan tentang isu-isu terkini. | | | | | | |
| CPL-11 | Mampu mengidentifikasi potensi daerah di Sumatera Utara dan menerapkan inovasi, metode, keterampilan, dan perangkat teknik elektro yang relevan untuk mengembangkan potensi daerah tersebut. | | | | | | |
| CPL-12 | Mampu mendesain sistem dan/atau proses untuk memanfaatkan energi baru dan terbarukan sebagai sumber energi listrik alternatif dari potensi sumber daya lokal dan nasional dengan wawasan global. | | | | | | |
| **Capaian Pembelajaran Mata Kuliah (CPMK)** | | |  | | | | |
| CPMK 1 | Memahami konsep dan perhitungan sederhana medan magnet tunak | | | | | | |
| CPMK 2 | Memahami teori dan perhitungan sederhanan fluks magnet dan gaya magnet | | | | | | |
| CPMK 3 | Memahami teori dan perhitungan sederhana Induktansi, magnetisasi dan permeabilitas dan rangkaian magnetik | | | | | | |
| CPMK 4 | Memahami teori dan perhitungan sederhana energi dan potensial magnetik, medan magnet yang berubah terhadap waktu serta daya magnetik dan keadaan perbatasan material magnetik | | | | | | |
| **Peta CPL – CPMK** | | |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **CPL 01** | **CPL 02** | **CPL 03** | **CPL 04** | **CPL 05** | **CPL 06** | **CPL 07** | **CPL 08** | **CPL 09** | **CPL 10** | **CPL 11** | **CPL 12** | | CPMK 1 | **V** |  | **V** | **V** | **V** |  |  |  |  |  |  |  | | CPMK 2 | **V** |  | **V** | **V** | **V** |  |  |  |  |  |  |  | | CPMK 3 | **V** |  | **V** | **V** | **V** |  |  |  |  |  |  |  | | CPMK 4 | **V** |  | **V** | **V** | **V** |  |  |  |  |  |  |  | | | | | | | | |
| **Diskripsi Singkat MK** | | Mata kuliah Medan Elektromagnetik 2 membahas tentang medan magnet tunak, lingkungan dan sumber medan magnet, fluks magnet, gaya magnetik, induktansi, magnetisasi dan permeabilitas, rangkaian magnetik, energi dan potensial magnetik, medan magnet yang berubah terhadap waktu, arus perpindahan dan keadaan medan magnetik pada perbatasan material berbeda. | | | | | | | |
| **Bahan Kajian:** Materi pembelajaran | | Medan Magnet, Hukum Biot-Savart, Aplikasi Hukum Biot Savart Pada Konduktor Lurus Tak Berhingga, Aplikasi Hukum Biot Savart Pada Konduktor Lurus Berhingga, Aplikasi Hukum Biot Savart Arus Arus Sirkular; Hukum Integral Ampre: Hukum Integral Ampere, Aplikasi Hukum Integral Ampere Pada Konduktor Lurus, Aplikasi Hukum Integral Ampere Pada Kabel Koaxial, Aplikasi Hukum Integral Ampere Akibat Arus Sirkular; Kurl: Penurunan Persamaan Kurl, Aplikasi Kurl, Fluks Magnet, Rapat Fluks Magnet; Teori Stokes dan Persamaan Maxwell: Teori Stokes, Persamaan Maxwell, Aplikasi Teori Stokes dan Persamaan Maxwell; Potensial Magnetik dan Penurunan Hukum Medan Magetik Tunak: Potensial Magnetik Skalar, Potensial Magnetik Vektor, Penurunan Hukum Medan Magnetik Tunak; Gaya Magnetik: Gaya Magnetik Pada Muatan Bergerak, Gaya Magnetik Pada Unsur Arus Diferensial, Gaya Magnetik Antara Unsur Arus Differensial, Torsi dan Momen Dwikutup; Magnetisasi dan Permeabilitas: Arus Lintasan dan Arus Spin, Magnetisasi, Permeabilitas; Bahan Magnetik dan Sifatnya: Feromagnetik, Diamagnetik, Paramagnetik, Antiferomagnetik, Superparamagnetik; Kurva Magnetisasi: Pengaruh Magnetisasi Tehadap Hubungan B dan H, Kurva B-H Pada Arus Bolak Balik, Remanensi, Efek Hysretisis dan Arus Eddy; Syarat Batas Magnetik: Kondisi Komponen Normal Dari Medan Magnetik, Kondisi Komponen Tangensial Dari Medan Magnetik, Kondisi Medan Magnet Pada Material Berlapis; Induktansi dan Induktansi Bersama: Induktansi, Induktansi Pada Solenoid, Induktansi Pada Toroid, Nduktansi Pada Kabel Koaksial, Nduktansi Bersama, Teori Rangkaian Listrik; Mahasiswa dapat mengerjakan latihan tentang rangkaian magnetik, energi potensial dan gaya pada bahan magnetik: reluktansi dan komponen rangkaian magnetik, rangkaian maknetik, celah magnetik, rangkaian magnetik pada inti besi; Mahasiswa memahami perkembangan teori medan yang berubah terhadap waktu: hukum faraday dan elektromotonsi, ilustrasi hukum faraday, arus perpindahan, korelasi antara medan listrik dan medan magnet yang berubah terhadap waktu; Mahasiswa memahami persamaan maxwell dan potensial: persamaan maxwell dalam bentuk titik, persamaan maxwell dalam bentuk integral, potensial yang berubah terhadap waktu, keadaan pada perbatasan material | | | | | | | |
| **Pustaka** | | **Utama:** |  | | | | | | |
| 1. William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014. 2. U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008 | | | | | | | |
| **Pendukung:** |  | | | | | | |
| 1. Matthew. O. Sadiku, “Element of Electromagnetics”, Oxford University Press; 6 edition, 2014 | | | | | | | |
| **Dosen Pengampu** | |  | | | | | | | |
| **Matakuliah syarat** | |  | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **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 & Teknik** |
| **(1)** | **(2)** | **(3)** | **(4)** | **Tatap Muka(5)** | **Daring (6)** | **(7)** | **(8)** |
| 1 | Mahasiswa memahami pengertian medan magnet, hukum Biot-Savart, aplikasi hukum Biot Savart pada konduktor lurus tak berhingga, aplikasi hukum Biot Savart pada konduktor lurus berhingga, aplikasi hukum Biot Savart arus arus sirkular serta mampu melakukan perhitungan sederhana | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Medan Magnet dan Hukum Biot Savart: Medan Magnet, Hukum Biot-Savart, Aplikasi Hukum Biot Savart Pada Konduktor Lurus Tak Berhingga, Aplikasi Hukum Biot Savart Pada Konduktor Lurus Berhingga, Aplikasi Hukum Biot Savart Arus Arus Sirkular  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 8% |
| 2 | Mahasiswa memahami pengertian medan magnet, hukum Biot-Savart, aplikasi hukum Biot Savart pada konduktor lurus tak berhingga, aplikasi hukum Biot Savart pada konduktor lurus berhingga, aplikasi hukum Biot Savart arus arus sirkular serta mampu melakukan perhitungan sederhana (lanjutan) | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Medan Magnet dan Hukum Biot Savart: Medan Magnet, Hukum Biot-Savart, Aplikasi Hukum Biot Savart Pada Konduktor Lurus Tak Berhingga, Aplikasi Hukum Biot Savart Pada Konduktor Lurus Berhingga, Aplikasi Hukum Biot Savart Arus Arus Sirkular (lanjutan)  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 3 | Mahasiswa memahami teori Integral Ampere pada konduktor lurus, aplikasi hukum Integral Ampere pada kabel koaxial, aplikasi hukum Integral Ampere akibat arus sirkular serta mampu melakukan perhitungan sederhana | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Hukum Integral Ampere, aplikasi hukum Integral Ampere pada konduktor lurus, aplikasi hukum Integral Ampere pada kabel koaxial, aplikasi hukum Integral Ampere akibat arus sirkular serta kemampuan melakukan perhitungan sederhana.  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 4 | Mahasiswa memahami teori teori persamaan Curl, aplikasi Curl, teori Stoke, fluks magnet, rapat fluks magnet serta mampu melakukan perhitungan sederhana. | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori persamaan Curl, aplikasi Curl, teori Stoke, fluks magnet, rapat fluks magnet serta kemampuan melakukan perhitungan sederhana.  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 5 | Mahasiswa memahami teori gaya magnetik pada muatan bergerak, gaya magnetik antara unsur arus differensial, torsi dan efek Hall serta mampu melakukan perhitungan sederhana | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori gaya magnetik pada muatan bergerak, gaya magnetik antara unsur arus differensial, torsi dan efek Hall serta kemampuan melakukan perhitungan sederhana e  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 6 | Mahasiswa memahami teori gaya magnetik pada muatan bergerak, gaya magnetik antara unsur arus differensial, torsi dan efek Hall serta kemampuan melakukan perhitungan sederhana (lanjutan) | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori gaya magnetik pada muatan bergerak, gaya magnetik antara unsur arus differensial, torsi dan efek Hall serta kemampuan melakukan perhitungan sederhana (lanjutan)  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 7 | Mahasiswa memahami teori arus lintasan, arus spin, kurva magnetisasi, hysterisis loop magnetisasi, permeabilitas dan rugi-rugi magnetik serta mampu melakukan perhitungan sederhana. | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori arus lintasan, arus spin, kurva magnetisasi, hysterisis loop magnetisasi, permeabilitas dan rugi-rugi magnetik serta kemampuan melakukan perhitungan sederhana.  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 8 | UJIAN TENGAH SEMESTER |  |  |  |  |  |  |
| 9 | Mahasiswa memahami teori reluktansi dan komponen rangkaian magnetik, rangkaian magnetik, celah magnetik, rangkaian magnetik pada inti besi serta mampu melakukan perhitungan sederhana. | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori reluktansi dan komponen rangkaian magnetik, rangkaian magnetik, celah magnetik, rangkaian magnetik pada inti besi serta kemampuan melakukan perhitungan sederhana.  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 8% |
| 10 | Mahasiswa memahami teori energi potensial, gaya magnetik, induktansi, induktansi pada solenoid, induktansi pada toroid, induktansi pada kabel koaksial, induktansi bersama dan teori rangkaian listrik serta mampu melakukan perhitungan sederhana | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori energi potensial, gaya magnetik, induktansi, induktansi pada solenoid, induktansi pada toroid, induktansi pada kabel koaksial, induktansi bersama dan teori rangkaian listrik serta kemampuan melakukan perhitungan sederhana  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 11 | Mahasiswa memahami teori energi potensial, gaya magnetik, induktansi, induktansi pada solenoid, induktansi pada toroid, induktansi pada kabel koaksial, induktansi bersama dan teori rangkaian listrik serta mampu melakukan perhitungan sederhana (lanjutan) | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori energi potensial, gaya magnetik, induktansi, induktansi pada solenoid, induktansi pada toroid, induktansi pada kabel koaksial, induktansi bersama dan teori rangkaian listrik serta kemampuan melakukan perhitungan sederhana (lanjutan)  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 12 | Mahasiswa memahami teori energi potensial, gaya magnetik, induktansi, induktansi pada solenoid, induktansi pada toroid, induktansi pada kabel koaksial, induktansi bersama dan teori rangkaian listrik serta mampu melakukan perhitungan sederhana (lanjutan) | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori energi potensial, gaya magnetik, induktansi, induktansi pada solenoid, induktansi pada toroid, induktansi pada kabel koaksial, induktansi bersama dan teori rangkaian listrik serta kemampuan melakukan perhitungan sederhana (lanjutan)  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 13 | Mahasiswa memahami teori arus perpindahan, perbedaan antara arus konduksi dengan arus perpindahan serta mampu melakukan perhitungan sederhana. | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Teori arus perpindahan, perbedaan antara arus konduksi dengan arus perpindahan serta kemampuan melakukan perhitungan sederhana.  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 14 | Mahasiswa memahami hukum Faraday dan elektromotonsi, ilustrasi Hukum Faraday, korelasi antara medan listrik dan medan magnet yang berubah terhadap waktu serta mampu melakukan perhitungan sederhana | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Hukum Faraday dan elektromotonsi, ilustrasi Hukum Faraday, korelasi antara medan listrik dan medan magnet yang berubah terhadap waktu serta kemampuan melakukan perhitungan sederhana  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 15 | Mahasiswa memahami kondisi komponen normal dari medan magnetik, kondisi komponen tangensial dari medan magnetik, kondisi medan magnet pada material berlapis serta mampu melakukan perhitungan sederhana | 1. *The accuracy in providing the information required* 2. *The student’s fluency in reading the memo (spelling, intonation, and speed)* 3. *The correctness of the student’s answers* | **Kriteria:**  *Marking Scheme*  **Bentuk:**  *Worksheet* (Non-Tes)   1. *Reading the memo provided.* 2. *Responding to the opening questions given.* 3. *Completing the table (problem-solution) according to the information in the memo.* 4. *Finding the word or phrase with similar meaning (synonym) according to the information in the memo.*   *Classifying the words or phrases with the correct headings.* | BM [(1x(2x60”)]  **Kegiatan:**   1. *Reviewing the previous lessons.* 2. *Reading the added learning materials.* 3. *Recording the presence.* 4. *Responding to opening questions in the ‘Discussion Forum’ section.* 5. *Submitting the assigned tasks.*   PT [(1x(2x60”)]  **Task 3:**  *Restating the information obtained in the form of an a-150-words paragraph.*  **Moda (*Learning Management System*):**  [elearning@usu.ac.id](mailto:elearning@usu.ac.id) | TM [(1x(2x50”)]  **Kegiatan:**   1. *Making notes of the learning materials explained.* 2. *Responding to the questions or instructions given.* 3. *Completing all the provided exercises individually.* 4. *Discussing the exercises completed.*   **Media:**  *Power Point Presentation (PPT)*  *Zoom Meeting*  *Audio Recording*  *English Handout*  **Metode Pembelajaran:**   1. *Online Lecture* 2. *Discussion* 3. *Self-Paced*   *Learning* | **Pokok Bahasan:**  Kondisi komponen normal dari medan magnetik, kondisi komponen tangensial dari medan magnetik, kondisi medan magnet pada material berlapis serta kemampuan melakukan perhitungan sederhana  **Referensi:**   1. **William H. Hayt, Jr. . John A. Buck, “Engineering Electromagnetics”, Mc Graw Hill, 8th Edition, 2014.** 2. **U. A. Bakshi, A. V. Bakshi, “Electromagnetic Fields”. Technical Publications, 2008** | 7% |
| 16 | UJIAN AKHIR SEMESTER |  |  |  |  |  |  |
|  | Total | | | | | | **100** |