|  |  |  |
| --- | --- | --- |
|  | **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** |
| Rangkaian Listrik 1 | TEE1110 |  | **Teori****2** | *Praktek**0* |  | 7 AGUSTUS 2022 |
| **OTORISASI / PENGESAHAN** | **Dosen Pengembang RPS** | **Koordinator RMK** | **Ka Prodi** |
| Ir. Raja Harahap, 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 | Memaham dasar rangkaian listrik |
| CPMK 2 | Memahami dasar-dasar teori dan hukum pada rangkaian listrik sederhana dan kompleks |
| CPMK 3 | Memahami secara logis teknik penyelesaian persoalan pada rangkaian listrik dan perubahan rangkaian |
| CPMK 4 | Mengenal konsep dasar dan analisis yang digunakan pada rangkaian listrik |
| **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 | V | V |  |  |  |  |  |  |
| CPMK 2  | V | V | V | V | V | V | V | V | V | V |  |  |
| CPMK 3 |  |  |  | V | V | V | V | V | V | V | V | V |
| CPMK 4 |  |  |  |  |  |  |  |  |  | V | V | V |

 |
| **Diskripsi Singkat MK** | Mata kuliah ini mencakup masalah pengertian dasar rangkaian listrik, sistem satuan, Hukum Kirchoff, Hukum Ohm, arus, dan tegangan, harga rata-rata dan harga efektif, impedansi dalam bentuk bilangan kompleks, perbedaan fasa antara dua gelombang sinusoidal, rangkaian seri dan paralel, metode analisa rangkaian, rangkaian gandeng magnetik, sistem tiga fasa dan Deret Fourier. |
| **Bahan Kajian:** Materi pembelajaran | Kontrak Perkuliahan (Peraturan, Tugas, Buku,Sistem Penilaian) dan Konsep Perancangan; Pengertian Dasar Rangkaian Listrik; Sistem Satuan, Hukum Ohm, Daya dan Energi; Rangkaian Seri-Paralel, Hukum Kirchhoff Tentang Tegangan- Arus, dan Teknik Pengukuran; Penerapan Hk. Ohm, Hk. Kirchhoff Pada Rangkaian Seri dan Paralel Untuk Sumber Dc; Bentuk Gelombang Ac Sinusoidal; Bilangan Kompleks; Fasor; Impedansi dan Admitansi; Rangkaian Seri-Paralel Sumber Ac; Metode Super Posisi; Metode Thevenin dan Northon; Analisis Arus Mesh; Analisis Tegangan Simpul/Node; Perubahan Rangkaian Dari Y - ∆ dan ∆ - Y; Mahasiswa dapat mengerjakan latihan tentang rangkaian tergandeng secara magnetik ,induktansi timbal balik, aturan tangan kanan-dot energi dalam rangkaian gandeng maknetik. kontanta gandeng; Mahasiswa memahami perkembangan teori pembangkitan emf pada kumparan, hubungan sumber 3 phasa, hubungan sumber dengan beban, tiga phasa seimbang, beban tiga phasa tak seimbang, daya pada sistem tiga phasa; Mahasiswa memahami bentuk eksponensial deret fourier, respons steady state fungsi periodik, spektrum daya dari sinyal periodik. |
| **Pustaka** | **Utama:** |  |
| 1. Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
 |
| **Pendukung:** |  |
| 1. WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
2. Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
3. Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
4. Robert L. Boylestad, 2003, *Introductory Circuit Analysis*, Tenth edition, Prentice Hall Pearson Education International.
5. A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.
6. DLL.
 |
| **Dosen Pengampu** | Ir. Raja Harahap, MT |
| **Matakuliah syarat** | Dasar Teknik Elektro |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 menguasai teori kontrak perkuliahan (peraturan, tugas, buku,sistem penilaian) dan konsep perancangan | 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 | 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:**Kontrak Perkuliahan (Peraturan, Tugas, Buku,Sistem Penilaian) dan Konsep Perancangan**Referensi:**1. Joseph A. Edminister, Theory and Problems of Electric Circuits, Third Edition, Schaum’s Outline Series McGRAW-HILL
 | 5% |
| 2 | Mahasiswa memahami pengertian dasar rangkaian listrik; sistem satuan, hukum ohm, daya dan energi | 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 | 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:**Pengertian Dasar Rangkaian Listrik; Sistem Satuan, Hukum Ohm, Daya dan Energi**Referensi:*** WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 3 | Mahasiswa menguasai rangkaian seri-paralel, hukum kirchhoff tentang tegangan- arus, dan teknik pengukuran | 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 | 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:**Rangkaian Seri-Paralel, Hukum Kirchhoff Tentang Tegangan- Arus, dan Teknik Pengukuran**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 4 | Mahasiswa mampu menerapkan teori penerapan hk. ohm, hk. kirchhoff pada rangkaian seri dan paralel untuk sumber dc | 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 | 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:**Penerapan Hk. Ohm, Hk. Kirchhoff Pada Rangkaian Seri dan Paralel Untuk Sumber Dc**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 5 | Mahasiswa dapat mengerjakan latihan tentang bentuk gelombang ac sinusoidal; bilangan kompleks; fasor | 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 | 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:**Bentuk Gelombang Ac Sinusoidal; Bilangan Kompleks; Fasor**Referensi:*** 1. WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 6 | Mahasiswa memahami perkembangan teori impedansi dan admitansi; rangkaian seri-paralel sumber ac | 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 | 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:**Mahasiswa memahami perkembangan teori impedansi dan admitansi; rangkaian seri-paralel sumber ac**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 7 | Mahasiswa dapat mempresentasikan pengetahuan metode super posisi | 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 | 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:**Metode Super Posisi**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 8 | UJIAN TENGAH SEMESTER |  |  |  |  |  | *15 %* |
| 9 | Mahasiswa menguasai teori metode thevenin dan northon | 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 | 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* | * WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 10 | Mahasiswa memahami analisis arus mesh | 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 | 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:**Analisis Arus Mesh**Referensi:*** 1. WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 11 | Mahasiswa menguasai analisis tegangan simpul/node | 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 | 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:**Analisis Tegangan Simpul/Node**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 12 | Mahasiswa mampu menerapkan teori perubahan rangkaian dari y - ∆ dan ∆ - y | 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 | 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:**Perubahan Rangkaian Dari Y - ∆ dan ∆ - Y**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 13 | Mahasiswa dapat mengerjakan latihan tentang rangkaian tergandeng secara magnetik ,induktansi timbal balik, aturan tangan kanan-dot energi dalam rangkaian gandeng maknetik. kontanta gandeng | 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 | 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:**Rangkaian Tergandeng Secara Magnetik ,Induktansi Timbal Balik, Aturan Tangan Kanan-Dot Energi Dalam Rangkaian Gandeng Maknetik. Kontanta Gandeng**Referensi:*** 1. WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 14 | Mahasiswa memahami perkembangan teori pembangkitan emf pada kumparan, hubungan sumber 3 phasa, hubungan sumber dengan beban, tiga phasa seimbang, beban tiga phasa tak seimbang, daya pada sistem tiga phasa | 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 | 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:**Pembangkitan Emf Pada Kumparan, Hubungan Sumber 3 Phasa, Hubungan Sumber Dengan Beban, Tiga Phasa Seimbang, Beban Tiga Phasa Tak Seimbang, Daya Pada Sistem Tiga Phasa**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 15 | Mahasiswa memahami bentuk eksponensial deret fourier, respons steady state fungsi periodik, spektrum daya dari sinyal periodik. | 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 | 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:**Bentuk Eksponensial Deret Fourier, Respons Steady State Fungsi Periodik, Spektrum Daya Dari Sinyal Periodik.**Referensi:*** 1WH. Hyat, JR., JE.Kemmerly, 1994, Rangkaian Listrik Jilid I, Penerbit Erlangga Jakarta.
* Budiono Ismail, 1997, Rangkaian Listrik Jilid Pertama, Penerbit ITB Bandung.
* Mohamad Ramdhani, 2008, Rangkaian Listrik, Penerbit Erlangga Jakarta.
* Josep A. Edminister MSE, Theory and Problem of Electric Circuits, Schaum’s Outline Series. Mc. Graw-Hill International Book Company.
* A. Bruce Carlson, 2000, CIRCUITS-Engineering Concepts and Analysis of Linier Electric Circuits, Brooks / Cole Thomson Learning.

 DLL | 5% |
| 16 | UJIAN AKHIR SEMESTER |  |  |  |  |  | *15 %* |
|  | Total  | **100** |