

|                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|-----------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------|-------------|-----|---------------------------|----------|----|----------------|-----------------|----|------|-----------|-------|-------|-------|--------|---|--|--|--|--------|--|---|--|--|--------|--|---|---|---|--------|---|---|---|---|---|----|----|----|----|----|----|----|--------|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|---|---|---|---|---|---|---|---|---|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|---|---|--|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|
|  |           | Universitas Negeri Surabaya<br>Fakultas Vokasi<br>Program Studi D4 Teknologi Rekayasa Otomotif                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                | Kode Dokumen    |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| RENCANA PEMBELAJARAN SEMESTER                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| MATA KULIAH (MK)                                                                  |           | KODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                             | Rumpun MK                       |                                      | BOBOT (sks) |     |                           | SEMESTER |    | Tgl Penyusunan |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| Analisis Numerik dan Perancangan Eksperimen                                       |           | 2130402020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                             | Mata Kuliah Wajib Program Studi |                                      | T=2         | P=0 | ECTS=3.18                 |          | 3  |                | 29 Agustus 2025 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| OTORISASI                                                                         |           | Pengembang RPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                             |                                 | Koordinator RMK                      |             |     | Koordinator Program Studi |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | Sudirman Rizki Ariyanto, M.Pd., M.T.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                             |                                 | Sudirman Rizki Ariyanto, M.Pd., M.T. |             |     | FERLY ISNOMO ABDI         |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| Model Pembelajaran                                                                |           | Project Based Learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| Capaian Pembelajaran (CP)                                                         |           | CPL-PRODI yang dibebankan pada MK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPL-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mampu memanfaatkan prinsip-prinsip dasar matematika, sains, mekanika, dan material teknik sebagai landasan dalam analisis, perancangan, dan pengembangan solusi teknis yang aplikatif di bidang keteknikan. |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPL-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mampu menerapkan metode optimasi desain dalam memecahkan masalah yang dihadapi dalam karir profesional dibidang otomotif                                                                                    |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPL-7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mampu merancang, menganalisis, dan melakukan pengujian serta pengembangan produk bidang otomotif melalui teknologi berbasis komputer terapan dan manufaktur canggih                                         |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPL-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mampu menerapkan analisis, perancangan, dan simulasi rekayasa kendaraan dengan memanfaatkan teknologi terkini untuk meningkatkan performa, keselamatan, dan efisiensi energi.                               |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | Capaian Pembelajaran Mata Kuliah (CPMK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPMK - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Mahasiswa mampu memahami dan menerapkan prinsip dasar matematika, statistika, dan sains dalam rancangan eksperimen sebagai landasan analisis data pada kasus bidang otomotif.                               |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPMK - 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Mahasiswa mampu merancang eksperimen dan menentukan faktor, level, serta respon menggunakan metode desain eksperimen (factorial, RSM, Taguchi) untuk mendukung optimasi desain di bidang otomotif.          |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPMK - 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Mahasiswa mampu menganalisis hasil eksperimen dan menyusun model matematis melalui teknologi berbasis komputer untuk pengujian serta pengembangan produk otomotif.                                          |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
|                                                                                   |           | CPMK - 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Mahasiswa mampu menginterpretasikan hasil eksperimen dan menyajikan solusi berbasis analisis numerik untuk meningkatkan performa, keselamatan, dan efisiensi energi kendaraan.                              |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| Matrik CPL - CPMK                                                                 |           | <table><tr><td>CPMK</td><td>CPL-5</td><td>CPL-6</td><td>CPL-7</td><td>CPL-8</td></tr><tr><td>CPMK-1</td><td>✓</td><td></td><td></td><td></td></tr><tr><td>CPMK-2</td><td></td><td>✓</td><td></td><td></td></tr><tr><td>CPMK-3</td><td></td><td></td><td>✓</td><td></td></tr><tr><td>CPMK-4</td><td></td><td></td><td></td><td>✓</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    | CPMK | CPL-5     | CPL-6 | CPL-7 | CPL-8 | CPMK-1 | ✓ |  |  |  | CPMK-2 |  | ✓ |  |  | CPMK-3 |  |   | ✓ |   | CPMK-4 |   |   |   | ✓ |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| CPMK                                                                              | CPL-5     | CPL-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CPL-7                                                                                                                                                                                                       | CPL-8                           |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| CPMK-1                                                                            | ✓         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| CPMK-2                                                                            |           | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| CPMK-3                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ✓                                                                                                                                                                                                           |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| CPMK-4                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                             | ✓                               |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |
| Matrik CPMK pada Kemampuan akhir tiap tahapan belajar (Sub-CPMK)                  |           | <table><tr><td rowspan="2">CPMK</td><td colspan="16">Minggu Ke</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td></tr><tr><td>CPMK-1</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CPMK-2</td><td></td><td></td><td></td><td></td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr><tr><td>CPMK-3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td><td>✓</td><td></td></tr><tr><td>CPMK-4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td></tr></table> |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    | CPMK | Minggu Ke |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  | 1 | 2 | 3 | 4      | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | CPMK-1 | ✓ | ✓ | ✓ | ✓ |  |  |  |  |  |  |  |  |  |  |  |  | CPMK-2 |  |  |  |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  |  |  | CPMK-3 |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ | ✓ |  | CPMK-4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |
| CPMK                                                                              | 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                                                              |           | Mata kuliah ini membekali mahasiswa dengan pengetahuan dan keterampilan dalam menerapkan metode analisis numerik serta perancangan eksperimen di bidang otomotif. Pembahasan meliputi prinsip dasar, distribusi sampel, analisis variansi, regresi, desain faktorial, metode RSM, hingga metode Taguchi untuk optimasi desain. Mahasiswa akan dilatih melalui studi kasus berbasis problem nyata, sehingga mampu menghasilkan solusi aplikatif dengan pendekatan saintifik dan teknologi terkini.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                             |                                 |                                      |             |     |                           |          |    |                |                 |    |      |           |       |       |       |        |   |  |  |  |        |  |   |  |  |        |  |   |   |   |        |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |   |   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |   |   |   |   |   |   |   |   |   |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |

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|----------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Pustaka        |                                                                                                            | Utama :                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                         |                                                                                  |                 |                                                                                                                                                                                                                                                                                                                                    |                     |
|                |                                                                                                            | 1. Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley & Sons, Inc.<br>2. Arora, J. S. (2017). Introduction to Optimum Design (4th ed.). Academic Press, Elsevier.<br>3. Myers, R. H., Montgomery, D. C., & Anderson-Cook, C. M. (2018). Response Surface Methodology: Process and Product Optimization using Designed Experiment (3rd ed.). John Wiley & Sons, Inc. |                                                                                                                                                                                                                                         |                                                                                  |                 |                                                                                                                                                                                                                                                                                                                                    |                     |
|                |                                                                                                            | Pendukung :                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                         |                                                                                  |                 |                                                                                                                                                                                                                                                                                                                                    |                     |
|                |                                                                                                            | 1. Ariyanto, S. R., & Arifianti, L. S. Y. (2025). Metode Numerik Terapan dengan Software Pemrograman. KBM Indonesia.<br>2. Ariyanto, S. R., Wulandari, R., & Suprayitno. (2023). Tuning artificial neural network parameters using Taguchi method. <a href="https://doi.org/10.1063/5.0115783">https://doi.org/10.1063/5.0115783</a>                                                               |                                                                                                                                                                                                                                         |                                                                                  |                 |                                                                                                                                                                                                                                                                                                                                    |                     |
| Dosen Pengampu |                                                                                                            | Prof. Dr. I Made Arsana, S.Pd., M.T.<br>Sudirman Rizki Ariyanto, M.Pd., M.T.                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                         |                                                                                  |                 |                                                                                                                                                                                                                                                                                                                                    |                     |
| 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              | Mampu menjelaskan prinsip dasar rancangan eksperimen dan ruang lingkup penerapannya dalam bidang otomotif. | 1.Mampu menguraikan definisi rancangan eksperimen.<br>2.Mampu menjelaskan perbedaan antara eksperimen acak, factorial design, dan optimasi.<br>3.Mampu memberikan contoh kasus otomotif yang relevan dengan rancangan eksperimen.                                                                                                                                                                  | <b>Kriteria:</b><br>1.Ketepatan menjelaskan definisi rancangan eksperimen.<br>2.Ketepatan membedakan jenis rancangan eksperimen.<br>3.Relevansi contoh kasus yang diberikan.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif | Ceramah interaktif, diskusi kelompok, studi kasus ringan.<br>150 menit           |                 | <b>Materi:</b><br>Pengantar rancangan eksperimen, ruang lingkup & relevansi dalam teknik otomotif.<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley & Sons, Inc.                                                                                                            | 5%                  |
| 2              | Mampu menghitung ukuran pemusatan dan penyebaran data pada eksperimen otomotif.                            | Mampu menghitung mean, median, varians, dan standar deviasi dari data eksperimen otomotif.                                                                                                                                                                                                                                                                                                         | <b>Kriteria:</b><br>Ketepatan perhitungan ukuran statistik dasar.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif                                                                                                            | Ceramah singkat, latihan soal, diskusi kelompok.<br>150 menit                    |                 | <b>Materi:</b> Statistik dasar untuk eksperimen.<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley & Sons, Inc.                                                                                                                                                              | 5%                  |
| 3              | Mampu mengidentifikasi ukuran sampel dan distribusi data.                                                  | Mampu menentukan ukuran sampel yang tepat dan mengenali distribusi data (normal, uniform, dsb).                                                                                                                                                                                                                                                                                                    | <b>Kriteria:</b><br>Ketepatan identifikasi ukuran dan distribusi sampel.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif, Praktik / Unjuk Kerja                                                                              | Praktikum analisis data, diskusi kelompok.<br>150 menit                          |                 | <b>Materi:</b><br>Distribusi Sampel<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley & Sons, Inc.<br><br><b>Materi:</b><br>Distribusi data eksperimen.<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley & Sons, Inc. | 5%                  |

|   |                                                                        |                                                                         |                                                                                                                                       |                                                |  |                                                                                                                                                                                                                                                                        |    |
|---|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 4 | Mampu menganalisis distribusi data nyata otomotif.                     | Mampu mengolah data distribusi hasil uji kendaraan.                     | <b>Kriteria:</b><br>Ketepatan analisis distribusi data.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif                    | Studi kasus, diskusi kelas. 150 menit          |  | <b>Materi:</b> Studi kasus distribusi data.<br><b>Pustaka:</b><br>Ariyanto, S. R., & Arifianti, L. S. Y. (2025). <i>Metode Numerik Terapan dengan Software Pemrograman. KBM Indonesia.</i>                                                                             | 5% |
| 5 | Mampu menyusun perencanaan eksperimen (faktor, level, respon, metode). | Mampu merancang rancangan percobaan sederhana dengan variabel otomotif. | <b>Kriteria:</b><br>Ketepatan menentukan faktor, level, dan respon.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif        | Simulasi, diskusi kelompok. 150 menit          |  | <b>Materi:</b><br>Perencanaan eksperimen.<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). <i>Design and Analysis of Experiment (8th ed.). John Wiley &amp; Sons, Inc.</i>                                                                                              | 5% |
| 6 | Mampu merancang eksperimen factorial design.                           |                                                                         | <b>Kriteria:</b><br>Ketepatan rancangan factorial design.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif                  | Ceramah, latihan software. 150 menit           |  | <b>Materi:</b><br>Factorial design.<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). <i>Design and Analysis of Experiment (8th ed.). John Wiley &amp; Sons, Inc.</i>                                                                                                    | 5% |
| 7 | Mampu menerapkan factorial design pada data otomotif.                  | Mampu menganalisis hasil factorial design.                              | <b>Kriteria:</b><br>Ketepatan analisis factorial design.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif                   | Praktikum software, laporan singkat. 150 menit |  | <b>Materi:</b><br>Factorial design.<br><b>Pustaka:</b><br>Montgomery, D. C. (2013). <i>Design and Analysis of Experiment (8th ed.). John Wiley &amp; Sons, Inc.</i>                                                                                                    | 5% |
| 8 | Mampu menjelaskan konsep RSM dan desain CCD.                           | Mampu menggambarkan rancangan CCD.                                      | <b>Kriteria:</b><br>Ketepatan menjelaskan langkah CCD.<br><br><b>Bentuk Penilaian :</b><br>Penilaian Hasil Project / Penilaian Produk | Ceramah, latihan software. 150 menit           |  | <b>Materi:</b> Konsep RSM dan desain CCD.<br><b>Pustaka:</b><br>Myers, R. H., Montgomery, D. C., & Anderson-Cook, C. M. (2018). <i>Response Surface Methodology: Process and Product Optimization using Designed Experiment (3rd ed.). John Wiley &amp; Sons, Inc.</i> | 5% |

|    |                                                       |                                                    |                                                                                                                   |                                            |  |                                                                                                                                                                                                                                                                                 |    |
|----|-------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 9  | Mampu menjelaskan konsep RSM dan desain BBD.          | Mampu menggambarkan rancangan BBD.                 | <b>Kriteria:</b><br>Ketepatan menjelaskan langkah BBD.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif | Ceramah, latihan software. 150 menit       |  | <b>Materi:</b> Konsep RSM dan desain BBD.<br><b>Pustaka:</b><br><i>Myers, R. H., Montgomery, D. C., &amp; Anderson-Cook, C. M. (2018). Response Surface Methodology: Process and Product Optimization using Designed Experiment (3rd ed.). John Wiley &amp; Sons, Inc.</i>      | 5% |
| 10 | Mampu menganalisis kasus otomotif menggunakan RSM.    | Mampu menganalisis data dengan RSM CCD/BBD.        | <b>Kriteria:</b><br>Ketepatan hasil analisis RSM.<br><br><b>Bentuk Penilaian :</b><br>Penilaian Praktikum         | Praktikum software, studi kasus. 150 menit |  | <b>Materi:</b><br>Response Surface Methodology<br><b>Pustaka:</b><br><i>Myers, R. H., Montgomery, D. C., &amp; Anderson-Cook, C. M. (2018). Response Surface Methodology: Process and Product Optimization using Designed Experiment (3rd ed.). John Wiley &amp; Sons, Inc.</i> | 5% |
| 11 | Mampu menjelaskan prinsip metode Taguchi.             |                                                    | <b>Kriteria:</b><br>Ketepatan menyusun OA.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif             | Ceramah, latihan software. 150 menit       |  | <b>Materi:</b> Metode Taguchi.<br><b>Pustaka:</b><br><i>Ariyanto, S. R., Wulandari, R., &amp; Suprayitno. (2023). Tuning artificial neural network parameters using Taguchi method. <a href="https://doi.org/...">https://doi.org/...</a></i>                                   | 5% |
| 12 | Mampu menganalisis studi kasus dengan metode Taguchi. | Mampu menghitung S/N Ratio dan menganalisis hasil. | <b>Kriteria:</b><br>Ketepatan analisis S/N Ratio.<br><br><b>Bentuk Penilaian :</b><br>Penilaian Praktikum         | Praktikum software, diskusi. 150 menit     |  | <b>Materi:</b> Metode Taguchi.<br><b>Pustaka:</b><br><i>Ariyanto, S. R., Wulandari, R., &amp; Suprayitno. (2023). Tuning artificial neural network parameters using Taguchi method. <a href="https://doi.org/...">https://doi.org/...</a></i>                                   | 5% |

|    |                                                                                                   |                                                                               |                                                                                                                                                                                 |                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |
|----|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 13 | Mampu membandingkan RSM dan Taguchi.                                                              | Mampu menguraikan kelebihan & keterbatasan RSM vs Taguchi.                    | <b>Kriteria:</b><br>Ketepatan membandingkan dua metode.<br><br><b>Bentuk Penilaian :</b><br>Aktifitas Partisipasif                                                              | Diskusi kelas, studi kasus kecil.<br>150 menit   |  | <b>Materi:</b><br>Response Surface Methodology<br><b>Pustaka:</b><br><i>Myers, R. H., Montgomery, D. C., &amp; Anderson-Cook, C. M. (2018). Response Surface Methodology: Process and Product Optimization using Designed Experiment (3rd ed.). John Wiley &amp; Sons, Inc.</i><br><br><b>Materi:</b> Metode Taguchi.<br><b>Pustaka:</b><br><i>Ariyanto, S. R., Wulandari, R., &amp; Suprayitno. (2023). Tuning artificial neural network parameters using Taguchi method. <a href="https://doi.org/...">https://doi.org/...</a></i> | 5%  |
| 14 | Mampu mengolah data eksperimen sesuai rancangan (Case Project 1).                                 | Mampu mengolah data eksperimen dengan metode yang dipilih.                    | <b>Kriteria:</b><br>Ketepatan analisis awal.<br><br><b>Bentuk Penilaian :</b><br>Penilaian Hasil Project / Penilaian Produk                                                     | Praktikum software, bimbingan.<br>150 menit      |  | <b>Materi:</b><br>Mengolah data eksperimen sesuai rancangan<br><b>Pustaka:</b><br><i>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley &amp; Sons, Inc.</i>                                                                                                                                                                                                                                                                                                                                          | 10% |
| 15 | Mampu menyusun laporan hasil analisis eksperimen.                                                 | Mampu menyusun laporan analisis eksperimen sesuai format.                     | <b>Kriteria:</b><br>Kelengkapan & ketepatan laporan.<br><br><b>Bentuk Penilaian :</b><br>Penilaian Portofolio                                                                   | Workshop laporan, diskusi.<br>150 menit          |  | <b>Materi:</b> Analisis eksperimen.<br><b>Pustaka:</b><br><i>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley &amp; Sons, Inc.</i>                                                                                                                                                                                                                                                                                                                                                                  | 10% |
| 16 | Mampu mempresentasikan hasil analisis eksperimen dan menarik kesimpulan aplikatif untuk otomotif. | Mampu menjelaskan hasil, menarik kesimpulan, dan menjawab pertanyaan audiens. | <b>Kriteria:</b><br>Ketepatan interpretasi, kejelasan presentasi, kemampuan menjawab pertanyaan.<br><br><b>Bentuk Penilaian :</b><br>Penilaian Hasil Project / Penilaian Produk | Presentasi kelompok, diskusi kelas.<br>150 menit |  | <b>Materi:</b> Hasil analisis eksperimen<br><b>Pustaka:</b><br><i>Montgomery, D. C. (2013). Design and Analysis of Experiment (8th ed.). John Wiley &amp; Sons, Inc.</i>                                                                                                                                                                                                                                                                                                                                                             | 15% |

#### Rekap Persentase Evaluasi : Project Based Learning

| No | Evaluasi                                   | Persentase |
|----|--------------------------------------------|------------|
| 1. | Aktifitas Partisipasif                     | 47.5%      |
| 2. | Penilaian Hasil Project / Penilaian Produk | 30%        |
| 3. | Penilaian Portofolio                       | 10%        |
| 4. | Penilaian Praktikum                        | 10%        |
| 5. | Praktik / Unjuk Kerja                      | 2.5%       |

**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, ketrampilan 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.