



Universitas Negeri Surabaya  
S1 Sains Data

Kode  
Dokumen

RENCANA PEMBELAJARAN SEMESTER

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                           |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------|-----|---------------------------|-----------------|------|-----|-----|-----|-----|--------|---|--|--|--|--------|--|---|--|--|--------|--|--|---|--|--------|--|--|--|---|
| MATA KULIAH (MK)                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                  | KODE                                                                                                                                                                                                                                                                                                                                      | Rumpun MK | BOBOT (sks)                                |     | SEMESTER                  | Tgl Penyusunan  |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
| Keamanan dan Integritas Data                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4920202072                                                                                                                                                                                                                                                                                                                                |           | 2                                          |     |                           | 25 Agustus 2026 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
| OTORISASI                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Pengembang RPS                                                                                                                                                                                                                                                                                                                            |           | Koordinator RMK                            |     | Koordinator Program Studi |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                           |           | Ibnu Febry Kurniawan, S.Kom., M.Sc., Ph.D. |     | YULIANI PUJI ASTUTI       |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
| Deskripsi Singkat MK                                             | Mata kuliah ini mengajarkan tentang konsep dan prinsip keamanan dan privasi data relevan bagi konteks ilmuwan data dan sesuai lingkup area Data Privacy, Security, Integrity, and Analysis for Security (DPSIA) pada ACM Curricula. Pokok bahasan mata kuliah ini termasuk konsep sistem keamanan, teknik enkripsi klasik, dasar kriptografi, model saling kepercayaan (mutual trust), serta topik-topik terkini terkait etika dan privasi data. |                                                                                                                                                                                                                                                                                                                                           |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
| Capaian Pembelajaran (CP)                                        | CPL-PRODI yang dibebankan pada MK                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                           |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPL                                                                                                                                                                                                                                                                                                                                                                                                                                              | Mengembangkan pemikiran logis, kritis, sistematis, dan kreatif dalam melakukan pekerjaan yang spesifik di bidang keahliannya serta sesuai dengan standar kompetensi kerja bidang yang bersangkutan                                                                                                                                        |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPL                                                                                                                                                                                                                                                                                                                                                                                                                                              | Memiliki kemampuan (pengelolaan) manajerial tim dan kerja sama (team work), manajemen diri, mampu berkomunikasi baik lisan maupun tertulis dalam berbagai konteks profesional                                                                                                                                                             |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPL                                                                                                                                                                                                                                                                                                                                                                                                                                              | Mampu mendesain, mengembangkan, dan mensimulasikan aplikasi teknologi multi-platform yang relevan dengan kebutuhan industri                                                                                                                                                                                                               |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPL                                                                                                                                                                                                                                                                                                                                                                                                                                              | Menguasai teori matematika, statistika, dan ilmu komputer/informatika                                                                                                                                                                                                                                                                     |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | Capaian Pembelajaran Mata Kuliah (CPMK)                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                           |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPMK-1                                                                                                                                                                                                                                                                                                                                                                                                                                           | Mampu menjelaskan konsep privasi data secara tepat                                                                                                                                                                                                                                                                                        |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPMK-2                                                                                                                                                                                                                                                                                                                                                                                                                                           | Mampu menunjukkan praktik penggunaan data secara etis                                                                                                                                                                                                                                                                                     |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPMK-3                                                                                                                                                                                                                                                                                                                                                                                                                                           | Mampu bekerja sama dalam implementasi teknologi sekuritas dan privasi data yang berguna dalam kehidupan nyata                                                                                                                                                                                                                             |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | CPMK-4                                                                                                                                                                                                                                                                                                                                                                                                                                           | Mampu menjelaskan mekanisme enkripsi secara umum                                                                                                                                                                                                                                                                                          |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | Matrik CPL - CPMK                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                           |           |                                            |     |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <table><tr><td>CPMK</td><td>CPL</td><td>CPL</td><td>CPL</td><td>CPL</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 | CPL | CPL | CPL | CPMK-1 | ✓ |  |  |  | CPMK-2 |  | ✓ |  |  | CPMK-3 |  |  | ✓ |  | CPMK-4 |  |  |  | ✓ |
|                                                                  | CPMK                                                                                                                                                                                                                                                                                                                                                                                                                                             | CPL                                                                                                                                                                                                                                                                                                                                       | CPL       | CPL                                        | CPL |                           |                 |      |     |     |     |     |        |   |  |  |  |        |  |   |  |  |        |  |  |   |  |        |  |  |  |   |
|                                                                  | 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  |                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | ✓                                          | ✓                                                                               | ✓   |                     |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| Pustaka | Utama :                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                            |                                                                                 |     |                     |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
|         |                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1. Stallings, William. 2011. Cryptography and Network Security System. United States: Prentice-Hall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                            |                                                                                 |     |                     |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
|         | Pendukung :                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                            |                                                                                 |     |                     |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
|         |                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1. Sivathanu, G., Wright, C. P., & Zadok, E. (2005, November). Ensuring data integrity in storage: Techniques and applications. In Proceedings of the 2005 ACM workshop on Storage security and survivability (pp. 26-36).<br>2. Lin, J., Yu, W., Zhang, N., Yang, X., & Ge, L. (2018). Data integrity attacks against dynamic route guidance in transportation-based cyber-physical systems: Modeling, analysis, and defense. IEEE Transactions on Vehicular Technology, 67(9), 8738-8753.<br>3. Pandey, A. K., Khan, A. I., Abushark, Y. B., Alam, M. M., Agrawal, A., Kumar, R., & Khan, R. A. (2020). Key issues in healthcare data integrity: Analysis and recommendations. IEEE Access, 8, 40612-40628. |           |                                            |                                                                                 |     |                     |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| Mg Ke-  | Kemampuan akhir tiap tahapan belajar (Sub-CPMK)                                                               | Penilaian                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                            | Bentuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu] |     | Materi Pembelajaran |   | Bobot Penilaian (%) |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
|         |                                                                                                               | Indikator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Kriteria & Bentuk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | Luring (offline)                           | Daring (online)                                                                 |     |                     |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| (1)     | (2)                                                                                                           | (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           | (5)                                        | (6)                                                                             | (7) | (8)                 |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| 1       | Mampu menjelaskan konsep privasi data secara tepat.                                                           | 1. Menjelaskan konsep dasar keamanan: CIA (Confidentiality, Integrity, and Availability).<br>2. Mengimplementasikan CIA.<br>3. Menjelaskan konsep dasar keamanan komputer, data, dan informasi.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Aktifitas Partisipasif                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | Kuliah<br>Tatap Muka<br>Ceramah<br>Diskusi |                                                                                 |     | 2%                  |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| 2       | Mampu menjelaskan konsep dan kebutuhan privasi data secara pribadi dan sosial (social responsibility)         | 1. Melakukan studi kasus terkait social responsibility.<br>2. Memahami opt-out questions.<br>3. Memahami pertanyaan-pertanyaan sensitif dan penerapannya serta efeknya.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Aktifitas Partisipasif, Praktik / Unjuk Kerja                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | Kuliah<br>Tatap Muka<br>Ceramah<br>Diskusi |                                                                                 |     | 2%                  |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| 3       | Mampu menguraikan sederhana konsep aturan terkait privasi dan keamanan data, serta implementasinya di sosial. | 1. Memahami konsep The European General Data Protection and Regulation (GDPR) di Eropa.<br>2. Melakukan studi kasus: pemindai wajah, sidik jari pada paspor, secure browsing dan fingerprinting (cookies).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Aktifitas Partisipasif                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | Kuliah<br>Tatap Muka<br>Ceramah<br>Diskusi |                                                                                 |     | 3%                  |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| 4       | Mampu menguraikan sederhana konsep aturan terkait privasi dan keamanan data, serta implementasinya di sosial. | Mahasiswa mempresentasikan kasus-kasus yang telah dipaparkan pada pertemuan sebelumnya.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Aktifitas Partisipasif, Praktik / Unjuk Kerja                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | Presentasi<br>Diskusi                      |                                                                                 |     | 3%                  |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| 5       | Mampu menjelaskan mekanisme enkripsi simetris                                                                 | 1. Memeahami konsep dasar enkripsi secara umum<br>2. Memahami prinsip dan cara kerja enkripsi klasik<br>3. Memahami konsep data encryption standard (DES)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Aktifitas Partisipasif                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | Kuliah<br>Tatap Muka<br>Ceramah<br>Diskusi |                                                                                 |     | 2%                  |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |
| 6       | Mampu menjelaskan mekanisme enkripsi simetris.                                                                | 1. Memahami prinsip dan cara kerja enkripsi blok<br>2. Memahami konsep advanced encryption standard (AES)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Aktifitas Partisipasif, Penilaian Portofolio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           | Kuliah<br>Tatap Muka<br>Ceramah<br>Diskusi |                                                                                 |     | 10%                 |   |                     |    |    |    |    |    |    |  |  |  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |        |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |   |        |  |  |  |  |  |  |  |   |   |   |  |   |   |   |   |  |        |  |  |   |   |  |  |  |  |  |  |   |  |  |  |  |  |        |  |  |  |  |   |   |   |  |  |  |  |  |  |  |  |  |

|    |                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                |                                   |  |  |     |
|----|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------|--|--|-----|
| 7  | Mampu menjelaskan mekanisme enkripsi asimetris.                                                                | <ol style="list-style-type: none"> <li>Memahami prinsip dan cara kerja asymmetric encryption</li> <li>Menjelaskan sistem kunci publik</li> <li>Menjelaskan sistem kerja RSA</li> <li>Memahami prinsip kerja hash</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Aktifitas Partisipasif, Penilaian Portofolio   | Kuliah Tatap Muka Ceramah Diskusi |  |  | 3%  |
| 8  | Ujian Tengah Semester                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Tes                                            |                                   |  |  | 25% |
| 9  | Mampu menunjukan praktik penggunaan keamanan dan integritas data.                                              | <ol style="list-style-type: none"> <li>Menjelaskan konsep logical and physical integrity.</li> <li>Menjelaskan konsep keamanan data pada kasus data storage.</li> <li>Mengaplikasikan integritas data pada data storage.</li> <li>Menerapkan metode atau teknik-teknik dalam menjaga integritas data.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                             | Aktifitas Partisipasif                         | Kuliah Tatap Muka Ceramah Diskusi |  |  | 2%  |
| 10 | Mampu menunjukan praktik penggunaan keamanan dan integritas data.                                              | <ol style="list-style-type: none"> <li>Memahami prinsip dan cara kerja autentikasi: One-time password (OTP) dan secure-stick (USB untuk autentikasi).</li> <li>Memahami konsep algoritme hash.</li> <li>Memahami konsep checksum code (md5, sha).</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Aktifitas Partisipasif                         | Ceramah Diskusi                   |  |  | 3%  |
| 11 | Mampu bekerja sama dalam implementasi teknologi sekuritas dan privasi data yang berguna dalam kehidupan nyata. | <ol style="list-style-type: none"> <li>Menjelaskan konsep tanda tangan digital.</li> <li>Mengetahui perbedaan digital signature dan electronic signature.</li> <li>Memahami cara kerja model saling kepercayaan (mutual trust).</li> <li>Menjelaskan prinsip protokol autentikasi pengguna.</li> <li>Memahami prinsip dan cara kerja E-Materai.</li> <li>Mengetahui penggunaan gnuPG untuk pengiriman email yang aman.</li> <li>Melakukan praktik file hashing dan verifikasinya.</li> <li>Melakukan praktik pembuatan kunci asinkron: private key</li> <li>Melakukan praktik implementasi/penggunaan kunci asinkron untuk autentikasi mesin: studi kasus Git</li> <li>Memahami konsep kunci PGP.</li> </ol> | Aktifitas Partisipasif, Praktik / Unjuk Kerja  | Cermah Diskusi                    |  |  | 3%  |
| 12 | Mampu menunjukan praktik penggunaan data secara etis                                                           | <ol style="list-style-type: none"> <li>Melakukan praktik pembuatan kunci asinkron: public key</li> <li>Memahami konsep OpenPGP.</li> <li>Melakukan praktik penggunaan key server PGP dalam pertukaran surel: Thunderbird mail, OpenPGP servers</li> <li>Memahami konsep keyserver, server-based authentication.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                   | Aktifitas Partisipasif                         | Diskusi Kelompok                  |  |  | 2%  |
| 13 | Mampu menunjukan praktik penggunaan data secara etis                                                           | Menelaah makalah Data Integrity Attacks against Dynamic Route Guidance in Transportation-based Cyber-Physical Systems: Modeling, Analysis, and Defense.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Aktifitas Partisipasif, Penilaian Hasil Projek | Diskusi Kelompok                  |  |  | 10% |
| 14 | Mampu menunjukan praktik penggunaan data secara etis                                                           | Menelaah makalah Data Integrity Attacks against Dynamic Route Guidance in Transportation-based Cyber-Physical Systems: Modeling, Analysis, and Defense.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Aktifitas Partisipasif                         | Diskusi Kelompok                  |  |  | 3%  |
| 15 | Mampu menelaah kasus-kasus pelanggaran keamanan dan integritas data.                                           | Mengumpulkan informasi dan menelaah kasus dan pelanggaran seperti kasus ransomware di Indonesia dan kasus peretasan data di Kementrian-kementrian.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Aktifitas Partisipasif, Penilaian Portofolio   | Diskusi kelompok                  |  |  | 2%  |

|    |                      |                                                                                         |                                               |            |  |  |     |
|----|----------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------|------------|--|--|-----|
| 16 | Ujian Akhir Semester | Mampu menyajikan analisis terkait kasus-kasus pelanggaran keamanan dan integritas data. | Aktifitas Partisipatif, Praktik / Unjuk Kerja | Presentasi |  |  | 25% |
|----|----------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------|------------|--|--|-----|

#### Catatan

1. **Capaian Pembelajaran Lulusan Program Studi (CPL-Prodi)** adalah rumusan kemampuan yang harus dimiliki oleh lulusan program studi yang mencakup sikap, penguasaan pengetahuan, keterampilan umum, dan keterampilan khusus sesuai dengan jenjang kualifikasi, yang diperoleh melalui proses pembelajaran.
2. **CPL-Prodi yang dibebankan pada Mata Kuliah** adalah bagian dari CPL-Prodi yang dipilih dan relevan untuk dikembangkan melalui suatu mata kuliah, sebagai dasar perumusan capaian pembelajaran mata kuliah.
3. **Capaian Pembelajaran Mata Kuliah (CPMK)** adalah kemampuan yang dirumuskan secara spesifik dan diturunkan dari CPL-Prodi yang dibebankan pada mata kuliah, serta menggambarkan kompetensi yang harus dicapai mahasiswa setelah menyelesaikan mata kuliah.
4. **Sub-CPMK** adalah kemampuan akhir yang direncanakan pada setiap tahap pembelajaran, sebagai penjabaran lebih rinci dari CPMK, bersifat terukur dan dapat diamati sesuai dengan materi pembelajaran.
5. **Indikator Penilaian** adalah pernyataan spesifik dan terukur yang digunakan untuk menilai ketercapaian Sub-CPMK, baik dari proses maupun hasil belajar mahasiswa, yang didukung dengan bukti penilaian.
6. **Kriteria Penilaian** adalah tolok ukur yang digunakan untuk menentukan tingkat ketercapaian hasil belajar mahasiswa berdasarkan indikator penilaian, guna menjamin penilaian yang objektif, konsisten, dan adil. Kriteria penilaian dapat bersifat kuantitatif dan/atau kualitatif.
7. **Bentuk Penilaian** meliputi penilaian tes dan non-tes sesuai dengan karakteristik capaian pembelajaran.
8. **Bentuk Pembelajaran** meliputi kuliah, responsi, tutorial, seminar atau bentuk lain yang setara, praktikum, praktik studio, praktik bengkel, praktik lapangan, penelitian, dan pengabdian kepada masyarakat.
9. **Metode Pembelajaran** merupakan cara penyampaian pembelajaran yang digunakan untuk mencapai capaian pembelajaran, antara lain Small Group Discussion, Project Based Learning, Case Based Learning, Collaborative Learning, Discovery Learning, Self-Directed Learning, serta metode lain yang relevan.
10. **Materi Pembelajaran** adalah bahan kajian yang disusun secara sistematis dalam bentuk pokok dan sub-pokok bahasan untuk mendukung pencapaian Sub-CPMK.
11. **Bobot Penilaian** adalah persentase kontribusi setiap komponen penilaian terhadap nilai akhir mata kuliah, yang ditetapkan secara proporsional sesuai tingkat kompleksitas dan ketercapaian Sub-CPMK, dengan total keseluruhan sebesar 100%.
12. TM = Tatap Muka, PT = Penugasan Terstruktur, BM = Belajar Mandiri.