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| **Unudlogo2** | **RENCANA PEMBELAJARAN SEMESTER**  **PEMODELAN DAN SIMULASI** |
| **Program Studi Teknik Informatika**  **Fakultas Matematika dan Ilmu Pengetahuan Alam**  **Universitas Udayana** |

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| 1 | | **Mata Kuliah** | | | **Nama** | | | | | | | | **Kode** | | | | | | | | | | | | | **Bobot** | | | | | | | **Semester** | | | | | | | | **Mata Kuliah Syarat** | | | | | | | |
| **Simulasi Komputer** | | | | | | | | IF1650033 | | | | | | | | | | | | | 3 sks | | | | | | | V | | | | | | | | Statistika | | | | | | | |
| 2 | | **Dosen Pengampu** | | | 1. I Dewa Made Bayu Atmaja Darmawan,S.Kom.M.Cs. (Koordinator) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kantor : Gd. BF Lt. 1  email : [dewabayu@cs.unud.ac.id](mailto:dewabayu@cs.unud.ac.id) | | | | | | | | | | | | | | | Ruang Kelas: Gedung BC  Kampus Bukit Jimbaran | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | **Deskripsi Mata Kuliah** | | | Mata Kuliah ini membekali mahasiswa untuk mengetahui konsep, prinsip dan tahapan serta implementasi dalam melakukan pemodelan dan simulasi. Berbagai model dan metode juga akan dibahas yaitu antara lain metode Monte Carlo, Model antrian, dan model dalam membangkitkan bilangan random. Beberapa studi kasus yang diberikan dalam mata kuliah ini diharapkan memberikan gambaran yang lebih realistik dalam melakukan tahapan pemodelan dan simulasi. Sehingga setelah mengikuti perkuliahan diharapkan mahasiswa memiliki mampu bersikap sebagai seorang yang profesional melalui penguasaan dan kemampuan implementasi pemodelan dan simulasi. Implementasi pembelajaran mata kuliah ini menggunakan pendekatan ekspositori dalam bentuk ceramah, diskusi, tanya jawab, dan pembelajaran mandiri menggunakan berbagai media dan fasiltas seperti LCD projector, video, dan e-learning. Melali pendekatan inquiri akan diarahkan untuk penyelesaian tugas penyusunan dan penyajian karya tulis ilmiah, mengulas buku dan jurnal ilmiah, diskusi dan penyelesaian masalah, serta kajian mandiri. Ketercapaian panguasaan materi di evaluasi melalui beberapa quiz yang yang terencana dan spontan, tugas rumah individu dan tugas kelompok langsung di sampaikan di kelas atau melalui forum tugas di e-learning, diskusi dan presentasi, ujian tengah semester dan ujian akhir semester. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | **CPL yang Dibebankan pada Mata Kuliah** | | | S3  S4  S9  S10  P1  P2  KU1  KU3  KK1 | | Berkontribusi dalam peningkatan mutu kehidupan bermasyarakat, berbangsa, bernegara, dan kemajuan peradaban berdasarkan Pancasila  Bekerja sama dan memiliki kepekaan sosial serta kepedulian terhadap masyarakat dan lingkungan  Menunjukkan sikap bertanggungjawab atas pekerjaan di bidang keahliannya secara mandiri  Menginternalisasi semangat kemandirian, kejuangan, dan kewirausahaan.  Menguasai konsep teoritis bidang pengetahuan Ilmu Komputer /Informatikasecara umum dan konsep teoritis bagian khusus dalam bidang pengetahuan tersebut secara mendalam, serta mampu memformulasikan penyelesaian masalah prosedural.  Memiliki pengetahuan yang memadai terkait dengan cara kerja sistem komputer dan mampu merancang dan mengembangkan berbagai algorithma /metode untuk memecahkan masalah.  Mampu menerapkan pemikiran logis, kritis, sistematis, dan inovatif dalam konteks pengembangan atau implementasi ilmu pengetahuan dan teknologi yang memperhatikan dan menerapkan nilai humaniora yang sesuai dengan bidang keahliannya;  Mampu mengkaji implikasi pengembangan atau implementasi ilmu pengetahuan teknologi yang memperhatikan dan menerapkan nilai humaniora sesuai dengan keahliannya berdasarkan kaidah, tata cara dan etika ilmiah dalam rangka menghasilkan solusi, gagasan, desain atau kritik seni, menyusun deskripsi saintifik hasil kajiannya dalam bentuk skripsi atau laporan tugas akhir, dan mengunggahnya dalam laman perguruan tinggi  Mampu merancang dan mengembangkan algorithma untuk berbagai keperluan seperti Network Security, Data Compression Multimedia Technologies, Mobile Computing Intelligent Systems, Information Management, Algorithms and Complexity, Human-Computer Interaction, Graphics and Visual Computing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | **Capaian Pembelajaran Mata Kuliah** | | | * Setelah mengikuti mata kuliah ini, mahasiswa dapat menjelaskan pemodelan dan simulasi komputer serta dapat menjelaskan kapan dan kenapa harus menggunakan simulasi. * Mahasiswa dapat menjelaskan cara kerja perangkat lunak simulasi dalam kaitannya dengan pemodelan waktu dan variabel simulasi. * Mahasiswa dapat menjelaskan metode simulasi dan dapat bekerja dalam tim untuk menyelesaikan masalah simulasi. * Mahasiswa dapat menuliskan dan mendesain model konseptual dari masalah yang diberikan. * Mahasiswa dapat mengumpulkan data dari kasus yang diberikan dan menganalisis variabel dan distribusi statistika. * Mahasiswa dapat mengimplementasikan model konseptual menjadi bentuk kode dengan menggunakan bahasa pemrograman. * Mahasiswa dapat menganalisis hasil simulasi dan menyajikan dalam bentuk grafik. * Mahasiswa dapat menjelaskan tahap implementasi untuk menjawab kesuksesan implementasi dan pengukuran yang berhasil dilakukan. * Mahasiswa dapat menjelaskan teknik pengujian verifikasi, validasi dan confidence (tingkat keyakinan) dari model simulasi yang dikembangkan. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | **Bahan Kajian (Materi Pembelajaran)** | | | 1. Pengenalan Simulasi Komputer 2. Perangkat Lunak Simulasi 3. Metode Simulasi 4. Model Konseptual 5. Pengumpulan Data dan Analisis 6. Pengkodean Model 7. Eksperimen: Mendapatkan Hasil Akurat, Perbandiangan Alternatif 8. Implementasi 9. Verifikasi, Validasi, dan Keyakinan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | **Rencana Pembelajaran** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke : I-II** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | | Mampu menjelaskan pengertian simulasi, kenapa harus melakukan simulasi dan kapan sebaiknya simulasi dikembangkan. Mahasiswa juga dapat memahami kelebihan dan kelemahan dalam pemodelan dan simulasi. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria /Indikator Capaian | | | | | | Kedalaman pemahaman/ketepatan penjelasan  Tingkat partisipasi dan kontribusi dalam kelompok  Tanggap kerja / tingkat ketepatan analisis parameter mutu | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian (Materi Pembelajaran): | | | | | | Pengenalan Pemodelan dan Simulasi Komputer:   * Pengertian Model dan Simulasi * Kenapa melakukan simulasi? * Kapan harus melakukan simulasi? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | | *Slide (ppt)* | | | | | | | | | *Audio* | | | | | | | | *Video* | | | | | | *URL* | | | | | | | | | | | | | | | |
|  | | | | *Pendahuluan studi simulasi*   * *Pengertian dan tujuan simulasi* * *Manfaat dan kelebihan pendekatan simulasi*   *Penerapan Simulasi*   * *Sistem, Model & Simulasi* * *Defnisi dari sistem dan model* * *Sistem, Model & Simulasi* | | | | | | | | |  | | | | | | | | *Pengantar Simulasi*  [*https://www.youtube.com/watch?v=OCMafswcNkY*](https://www.youtube.com/watch?v=OCMafswcNkY)  *Contoh Simulasi*  [*https://youtu.be/YeYW8TIWLG8*](https://youtu.be/YeYW8TIWLG8) | | | | | |  | | | | | | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and self assessment)* * *Tugas terstruktur (Latihan)* | | | | | | | | | | | | | | | | * *Aktivitas kelas: Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *2 x 3 x 60 menit belajar mandiri;*  *2 x 3x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | *2 x 3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Penilaian Pembelajaran | | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | |
| *On-line* | | | | | | | | *F2F* | | | | | | | | *On-line* | | | | | | | | | | | | | *F2F* | | | | | | | | | | | |
| *Tugas Essay dan feedback*  *Quiz*  *Forum* | | | | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | | | | | | |  | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih menulis laporan* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* * *Praktik pengukuran parameter mutu produk pascapanen hortikultura* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | | | | Aktivitas On-line | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke : III-IV** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | | *Mahasiswa dapat menjelaskan dan memodelkan simulasi kemajuan waktu pada kasus yang diberikan. Mahasiswa dapat memodelkan variabilitas, membangkitkan bilangan acak dan menguji pembangkit bilangan acak tersebut, dan menggunakan bilangan acak dalam simulasi.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria /Indikator Capaian | | | | | | *Kedalaman pemahaman/ketepatan penjelasan*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok*  *Tanggap kerja / tingkat kinerja pelaksanaan praktikum dan reporting* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | | | Perangkat Lunak Simulasi:   * Pemodelan kemajuan waktu * Pemodelan Variabilitas | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | *Slide (ppt)* | | | | | | | | | | *Audio* | | | *Video* | | | | | | | | | | | | | *URL* | | | | | | | | | | | | | | |
|  | | Pemodelan kemajuan waktu   * The Time-Slicing Approach * The Discrete-Event Simulation Approach * The Continuous Simulation Approach   Pemodelan Variabilitas   * Memodelkan variabilitas yang tidak dapat diprediksi * Bilangan Acak * Menghubungkan bilangan acak ke variabilitas dalam simulasi * Pemodelan variabilitas pada waktu * Pengambilan sampel dari distribusi statistik standar * Komputer menghasilkan nomor acak * Pemodelan variabilitas yang dapat diprediksi | | | | | | | | | |  | | | *Pembangkitan Bilangan Random dengan Python*  [*https://www.youtube.com/watch?v=zWL3z7NMqAs*](https://www.youtube.com/watch?v=zWL3z7NMqAs) | | | | | | | | | | | | | *Uji Bilangan Random Run Test*  [*https://www.eg.bucknell.edu/~xmeng/Course/CS6337/Note/master/node44.html*](https://www.eg.bucknell.edu/~xmeng/Course/CS6337/Note/master/node44.html) | | | | | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and self assessment-quiz/forum)* * *Tugas terstruktur: Pembuatan Laporan* | | | | | | | | | | | | | | | | * *Aktivitas kelas: Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* * *Membuat program pembangkit bilangan acak* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *3 x 60 menit belajar mandiri;*  *3x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | *3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* |
|  | | | | | | *On-line* | | | | | | *F2F* | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | | | | | | | |  |
| *Laporan*  *Quiz*  *Forum* | | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | | | | | | |  |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih menulis laporan* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* * *Membuat program pembangkitan bilangan acak dan menguji program tersebut dengan menggunakan run test dan chi square.* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | | | | Aktivitas On-line | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: V** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | | *Mahasiswa dapat menjelaskan gambaran umum pengembangan simulasi yang meliputi tahapan dalam menyelesaikan masalah dengan menggunakan teknik simulasi komputer.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria /Indikator Capaian | | | | | | *Kedalaman pemahaman/ketepatan penjelasan*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | | | Metodologi Pengembangan Simulasi | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | | | | | | | | *Slide (ppt)* | | | | *Audio* | | | | | | | | | | | | *Video* | | | | | | *URL* | | | | | | | | | | |
|  | | | | | | | | | | * *Sekilas Tentang Kunci Proses Pemodelan*   *Metodologi:*   * *Konseptual Model* * *Pengumpulan Data dan Analisis* * *Model Coding* * *Eskperimen* * *Implementasi* * *Pengujian* | | | |  | | | | | | | | | | | |  | | | | | |  | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and self assessment-Quiz/Forum)* * *Tugas terstruktur: Pembuatan Laporan* | | | | | | | | | | | | | | | | * *Aktivitas kelas: Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *3 x 60 menit belajar mandiri;*  *3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | *3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | | | |
| *On-line* | | | | | | *F2F* | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | |  | | | | | | | |
| *Laporan tugas* | | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | |  | | | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih menulis laporan* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | * *Aktivitas kelas: Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: VI dan VII** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | | *Mahasiswa mampu menjelaskan kebutuhan dalam mengembangkan model konseptual. Setelah itu, mahasiswa dapat mengembangan model konseptual dari simulasi sesuai dengan kasus yang diberikan.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria /Indikator Capaian | | | | | | *Kedalaman pemahaman/ketepatan penjelasan*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | | | Pengembangan Model konseptual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | | *Slide (ppt)* | | | | | | | | | | | | | | | | | *Audio* | | | | | | *Video* | | | | | *URL* | | | | | | | | | | |
|  | | | | *Pemaparan Model Konseptual*   * *Definisi Model Konseptual* * *Requirements of the Conceptual Model* * *Mengkomunikasikan Model Konseptual*   *Pengembangan Model Konseptual* | | | | | | | | | | | | | | | | |  | | | | | |  | | | | |  | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and assessment – quiz/forum)* * *Tugas terstruktur: Laporan Latihan* | | | | | | | | | | | | | | | | * *Aktivitas kelas: Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* * *Membuat model konseptual* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *2 x 3 x 60 menit belajar mandiri;*  *2 x 3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | *2 x 3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | |
| *On-line* | | | | | *F2F* | | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | | |  | | | | | |
| *Assignment dan feedback*  *Quiz*  *Forum* | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | |  | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih membuat tugas* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* * *Presentasi Project I* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Kompuetr, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | | | | Aktivitas On-line | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: VIII Summative Test (UTS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | *Mampu menjawab/menjelaskan pertanyaan tertulis dari fasilitator* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria/Indikator | | | | | *Kemampuan mengevaluasi/Ketepatan memilih dan membandingkan* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian | | | | | *Seluruh bahan kajian yang diberikan sebelumnya* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | *Belajar mandiri dan Evaluasi pembelajaran* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *8 x 60 menit belajar mandiri* | | | | | | | | | | | | | | | | *2 x 50 menit (Aktivitas Kelas)*  *2 x 50menit summative test* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | | |
| *On-line* | | | *F2F* | | | | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | |  | | | | | | |
| *Tugas Online* | | | *Sumative test* | | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | |  | | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Mengerjakan Tugas Online* | | | | | | | | | | | | | | | | * *Mengerjakan test sumative* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | | | | Aktivitas On-line | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: IX dan X** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | | Setelah diberikan pemaparan dan aktifitas daring, mahasiswa dapat memahami mendapatkan data secara akurat. Mahasiswa dapat mengindentifikasi kebutuhan data dalam simulasi. Mahasiswa dapat memahami metode dalam pemodelan variabilitas. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria /Indikator Capaian | | | | | | *Kedalaman pemahaman dan analisis/ketepatanpenjelasan dan analisis*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | | | Pengumpulan Data dan Analisis   * Identifikasi kebutuhan data * Pemodelan Varibilitas: trace, distribusi empiris, distribusi statistika, bootstrapping. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | | | | | | | *Slide (ppt)* | | | | | | | | | | *Audio* | | | | | *Video* | | | | | | | | *URL* | | | | | | | | | | |
|  | | | | | | | | | * *Definisi data* * *Mendapatkan data akurat* * *Merepresentasikan variabilitas tak terduga* * *Memilih distribusi statistik* | | | | | | | | | |  | | | | |  | | | | | | | |  | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and assessment-Quiz/forum)* * *Tugas terstruktur: long essay asignment* | | | | | | | | | | | | | | | | * *Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *2 x 3 x 60 menit belajar mandiri;*  *2 x 3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | *2 x 3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | |
| *On-line* | | | | *F2F* | | | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | | |  | | | | | |
| *Assignment dan feedback*  *Quiz*  *Forum* | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | |  | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih membuat tugas* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Kompuetr, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | | | Aktivitas On-line | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: XI** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | | | *Mahasiswa mampu menerapkan model konseptual menggunakan bahasa pemrograman untuk membangun simulasi komputer.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria/Indikator | | | | | | *Kedalaman pemahaman dan analisis/ketepatan penjelasan dan analisis*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | | | Pengkodean Model   * Metode Pengkodean Simulasi * Teknik Pengkodean Simulasi | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | | | | *Slide (ppt)* | | | | | | | | *Audio* | | | | | | | | *Video* | | | | | | | | | | | | *URL* | | | | | | | | |
| *Simulasi menggunakan bahasa pemrograman python* | | | | | | * *Definisi model coding* * *Penataan model* * *Pengkodean* * *Penggunaan Pseudo Random Number Stream* * *Dokumentasi* | | | | | | | |  | | | | | | | | 1. *Membuat Simulasi Bouncing Ball dengan Python*     [*https://www.youtube.com/watch?v=HHQV3ifJopo*](https://www.youtube.com/watch?v=HHQV3ifJopo)   1. *SimPy: Pustaka Simulasi pada Python*   [*https://www.youtube.com/watch?v=Bk91DoAEcjY*](https://www.youtube.com/watch?v=Bk91DoAEcjY) | | | | | | | | | | | | *Discrete Event Simulation fo Python*  [*https://simpy.readthedocs.io/en/latest/*](https://simpy.readthedocs.io/en/latest/) | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and assessment-Quiz/forum)* * *Tugas terstruktur: Laporan Pengembangan Kode Simulasi* | | | | | | | | | | | | | | | | * *Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* * *Praktik aplikasi simulasi dengan bahasa pemrograman* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *3 x 60 menit belajar mandiri;*  *3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | *3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | | | *Metode* | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | |
| *On-line* | | | *F2F* | | | | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | | |  | | | | | |
| *Assignment dan feedback*  *Quiz*  *Forum* | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | |  | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih membuat tugas* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* * *Mengembangkan aplikasi simulasi dengan bahasa pemrograman* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | | | *On-line* | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | | | Aktivitas On-line | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: XII dan XIII** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | *Mahasiswa mampu menjelaskan dan menerapkan teknik eksperimen simulasi dan mendapatkan hasil yang akurat. Mahasiswa dapat memahami teknik untuk mencari ruang solusi dan membandingkan 2 alternatif solusi untuk mencari alternatif solusi terbaik.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria/Indikator | | | | *Kedalaman pemahaman dan analisis/ketepatan penjelasan dan analisis*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | *Eksperimen: Mendapatkan hasil akurat* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | *Slide (ppt)* | | | | | | | | | | *Audio* | | | | | | *Video* | | | | | | | | | | | | | | *URL* | | | | | | | | | | | |
| *Simulasi Replikasi*  *Simulasi Pembandingan 2 alternatif* | | | *Mendapatkan Hasil Akurat*   * *Sifat Model Simulasi Dan Output Simulasi* * *Masalah Dalam Memperoleh Hasil Simulasi Yang Akurat* * *Model Contoh : Help Desk Pengguna Komputer* * *Inisialisasi Bias : Warm-Up Dan Initial State* * *Memilih Jumlah Replikasi Dan Run-Length*   *Mencari Ruang Solusi*   * *Interactive and batch experimentation* * *Comparing alternatives and search experimentation* | | | | | | | | | |  | | | | | |  | | | | | | | | | | | | | |  | | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | *On-line* | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and assessment-Quiz/forum)* * *Tugas terstruktur: Laporan Praktikum* | | | | | | | | | | | | | | | | | | * *Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* * *Praktik pelapisan bahan nabati* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | *On-line* | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *2 x 3 x 60 menit belajar mandiri;*  *2 x 3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | | | *2 x 3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | *Metode* | | | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | |
| *On-line* | | | | | *F2F* | | | | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | | |  | | | | | |
| *Assignment dan feedback*  *Quiz*  *Forum* | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | |  | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | *On-line* | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih membuat tugas* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | *On-line* | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Kompuetr, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | Aktivitas On-line | | | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: XIV** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | | *Mahasiswa dapat menjelaskan peran simulasi dalam penerapan pada masalah nyata. Mahasiswa dapat mengukur keberhasilkan simulasi yang dikembangkan berdasarkan permasalahan kasus nyata yang disimulasikan.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria/Indikator | | | | *Kedalaman pemahaman dan analisis/ketepatan penjelasan dan analisis*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | | Impementasi | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | *Slide (ppt)* | | | | | | | | | | | | | | | | | *Audio* | | | | | *Video* | | | | | | | | | *URL* | | | | | | | | | | |
|  | | | * *Definisi Implementasi* * *Implementasi dan kesuksesan project simulasi* | | | | | | | | | | | | | | | | |  | | | | |  | | | | | | | | |  | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and assessment-Quiz/forum)* * *Tugas terstruktur:short essay asignment* | | | | | | | | | | | | | | | | | | | | * *Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | |
| *3 x 60 menit belajar mandiri;*  *3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | | | | | *3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | | *Metode* | | | | | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | |
| *On-line* | | | | | *F2F* | | | | | | | | | | | | | | | *On-line* | | | | | | | | | | | | *F2F* | | | | | | |  | | | | | |
| *Assignment dan feedback*  *Quiz*  *Forum* | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | *Rubrik Holistik* | | | | | | |  | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih membuat tugas* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Kompuetr, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | Aktivitas On-line | | | | | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: XV** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | | *Mahasiswa mampu menguji model simulasi dengan teknik verifikasi dan validasi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria/Indikator | | | *Kedalaman pemahaman dan analisis/ketepatan penjelasan dan analisis*  *Kerjasama dalam tim (Valuing)/tingkat partisipasi dan kontribusi dalam kelompok* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian: | | | Verifikasi dan Validasi | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sumber Pembelajaran on-line* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Teks* | | | | | | *Slide (ppt)* | | | | | | | | | | | | | | *Audio* | | | | | | | | | | | | | | | *Video* | | | | | | | *URL* | | |
|  | | | | | | * *Definisi Verifikasi dan Validasi* * *Tantangan* * *Metode Verifikasi dan Validasi* | | | | | | | | | | | | | |  | | | | | | | | | | | | | | |  | | | | | | |  | | |
| Bentuk dan Metode Pembelajaran | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri (self learning and assessment-Quiz/forum)* * *Tugas terstruktur:short essay asignment* | | | | | | | | | | | | | | | | | | | | * *Pemaparan singkat, diskusi kelompok.dan presentasi mahasiswa (pengembangan inter-personal skills)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | |
| *3 x 60 menit belajar mandiri;*  *3 x 60 menit tugas terstruktur* | | | | | | | | | | | | | | | | | | | | *3 x 50 menit (Aktivitas Kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | *Metode* | | | | | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | *Bobot Nilai* | | | | | | | | | |
|  | | | *On-line* | | | | | | *F2F* | | | | | | | | | | | | | | *On-line* | | | | | | | *F2F* | | | | | | | |  | | | | | | | | | |
| Assesment Pembelajaran | | | *Assignment dan feedback*  *Quiz*  *Forum* | | | | | | * *Observation (Q/A)* * *Presentasi* | | | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | *Rubrik Holistik* | | | | | | | |  | | | | | | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Berlatih membuat tugas* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* * *Presentasi Project II* | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | | *On-line* | | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | Aktivitas On-line | | | | | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | |
| I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | I Dewa Made Bayu Atmaja Darmawan | | | | | | | | | | | | | | | | | | | | | | | | |
| **Minggu ke: XVI Summative Test (UAS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kemampuan Akhir Mahasiswa | | *Mampu menjawab/menjelaskan pertanyaan tertulis dari fasilitator* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kriteria/Indikator | | *Kemampuan mengevaluasi/Ketepatan memilih dan membandingkan* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bahan Kajian | | *Seluruh bahan kajian yang diberikan sebelumnya (Minggu IX-XV)* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bentuk dan Metode Pembelajaran | | *Belajar mandiri dan Evaluasi pembelajaran* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Beban Waktu Pembelajaran | | | *On-line* | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas/Praktikum)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *8 x 60 menit belajar mandiri* | | | | | | | | | | | | | | | | | | | *2 x 50 menit (Aktivitas Kelas)*  *2 x 50menit summative test* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assesment Pembelajaran | | *Metode* | | | | | | | | | | | | | | | | | | | *Instrumen* | | | | | | | | | | | | | | | | | | | | | | | *Bobot Nilai* | | | |
| *On-line* | | | | | | *F2F* | | | | | | | | | | | | | *On-line* | | | | | | | | | | | | | | *F2F* | | | | | | | |  | | | | |
| *Quiz*  *Forum* | | | | | | * *Observation (Q/A)* * *Presentasi* * *Sumative test* | | | | | | | | | | | | | *Rubrik holistic*  *Pilihan ganda dan B/S (Format Online)*  *Forum (Format Online)* | | | | | | | | | | | | | | *Rubrik Holistik* | | | | | | | |  | | | | |
| Pengalaaman Belajar / Aktivitas Mahasiswa | | *On-line* | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * *Belajar mandiri* * *Mengerjakan Quiz dan Forum* | | | | | | | | | | | | | | | | | | | * *Belajar berkelompok dan berdiskusi (pengembangan inter-personal skills)* * *Mengerjakan test sumative* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Media Pembelajaran | | *On-line* | | | | | | | | | | | | | | | | | | | *F2F (aktivitas kelas)* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *On-line: perangkat computer/gadget dan akses internet* | | | | | | | | | | | | | | | | | | | *Pembelajaran di kelas: Komputer, head projector (in focus) dan alat tulis* | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasilitator | | | Aktivitas On-line | | | | | | | | | | | | | | | | | | | Aktivitas Kelas/Praktikum | | | | | | | | | | | | | | | | | | | | | | | | | | |

**8. Daftar Pustaka**

# Buku Ajar:

**Buku Teks dan Artikel:**

1. Robinson, Stewart, **“**Simulation : the practice of model development and use**”,** John Wiley & SonsLtd., England, 2004.
2. Law, A.M. and W.D. Kelton, “Simulation Modeling and Analysis,” 3rd ed., McGraw-Hill, Boston, 2000.
3. Bonett S., “Simulasi Teori dan Aplikasinya”, Penerbit Andi.
4. Erma Suryani,” Pemodelan dan Simulasi”, Graha Ilmu.
5. Martin H.,Monte Carlo Simulation, IEOR E4703.

# Video Movie:

Pengantar Simulasi (<https://youtu.be/OCMafswcNkY>)

Contoh Simulasi Komputer (<https://youtu.be/YeYW8TIWLG8>)

Pembangkitan Bilangan Random (<https://youtu.be/zWL3z7NMqAs>)

Simulasi Bouncing Ball dengan Pemrograman Python Bagian1 (<https://youtu.be/HHQV3ifJopo>)

Simulasi Bouncing Ball dengan Pemrograman Python Bagian2 (<https://youtu.be/ibdICVK0W3Q>)

Simulasi Bouncing Ball dengan Pemrograman Python Bagian3 (<https://youtu.be/CZO_UzegLC0>)

Simulasi Bouncing Ball dengan Pemrograman Python Bagian4 (<https://youtu.be/horBQxH0M5A>)

SimPy: Pustaka Simulasi pada Python (<https://youtu.be/Bk91DoAEcjY>)

# Penilaian

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Formative Assessment | | |  | Proportion of Score |
|  | Problem Based Learning 1 | | : | 15% |
|  | Problem Based Learning 2 | | : | 20% |
|  | Work Book | | : | 10% |
|  | Forum | |  | 10% |
| Summative Assessment | | |  |  |
|  | Multiple Choice Based Assessment (weekly Quiz) | | : | 15% |
|  | Middle Semester Test | | : | 15% |
|  | End Semester test | | : | 15% |
| 100% | | | | |
| Grading Scale | | | | |
|  | 80-100 | A |  | |
|  | 70- <80 | B + |  | |
|  | 65-<70 | B |  | |
|  | 60-<65 | C + |  | |
|  | 55-<60 | C |  | |
|  | 45-<55 | D |  | |
|  | <45 | E |  | |

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| --- | --- |
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| Disahkan olehKetua Program Studi(………………………………………………….)NIP. | |