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|  | | **POLITEKNIK NEGERI MALANG**  **JURUSAN TEKNOLOGI INFORMASI**  **PROGRAM STUDI : D4 TEKNIK INFORMATIKA** | | | | | | | | | | | | | |
| **RENCANA PEMBELAJARAN SEMESTER (RPS)** | | | | | | | | | | | | | | | |
| **MATA KULIAH** | | **KODE** | | **RUMPUN MATA KULIAH** | | | | | **BOBOT (sks)/jam** | | **SEMESTER** | | **TGL. PENYUSUNAN** | | |
| Artificial Intelligence | | RTI203003 | |  | | | | | 2/4 | | 3 | | 27 Agustus 2023 | | |
| **OTORISASI** | | **Dosen Pengembang RPS** | | | | | | | **Koordinator RMK** | | **Ka PRODI** | | | | |
| M. Hasyim Ratsanjani  Candra Bella Vista  Kadek Suarjuna Batubulan | | | | | | | M. Hasyim Ratsanjani | | Dr. Ely Setyo Astuti, ST., MT. | | | | |
| **Capaian Pembelajaran (CP)** | | **Capaian Pembelajaran Lulusan Program Studi (CPL-Prodi)** | | | | | | | | |  | | | | |
| |  |  | | --- | --- | | **S8** | Menginternalisasi nilai, norma, dan etika akademik. | | **S9** | Menunjukkan sikap bertanggungjawab atas pekerjaan di bidang keahliannya secara mandiri. | | **PP1** | Menguasai konsep matematika terapan, pengetahuan dasar TIK (Algoritma, Pemrograman, Basis Data, jaringan komputer, dll), sains rekayasa, dan prinsip rekayasa dalam bidang TIK secara mendalam. | | **PP4** | Menguasai prinsip komputasi cerdas dalam teknik pembuktian lojik dan matematis (logic & mathematical proof) untuk menghasilkan alternatif solusi yang efektif secara mendalam. | | **KK1** | Mampu menerapkan matematika terapan, pengetahuan komputasi (Algoritma, Pemrograman dan Basis Data ), sains rekayasa, dan prinsip rekayasa dalam bidang pengembangan perangkat lunak (desktop, web maupun mobile), jaringan komputer dan bidang TIK / IPTEKS lainnya (vision – graphics, embeded, Sistem Informasi, sistem Cerdas, Business Intelligence, dll). | | **KK4** | Mampu memanfaatkan komputasi cerdas dalam proses pemecahan masalah berdasarkan analisis dan informasi pada produk TIK. | | **KU1** | Mampu menerapkan pemikian logis, kritis, inovatif, bermutu, dan terukur dalam melakukan pekerjaan yang spesifik di bidang keahliannya serta sesuai dengan standar kompetensi kerja bidang yang bersangkutan. | | **KU2** | Mampu menunjukkan kinerja mandiri, bermutu dan terukur. | | | | | | | | | | | | | | |
| **Capaian Pembelajaran Lulusan yang dibebankan pada mata kuliah (CPL-MK)** | | | | | | | | | | | |  | |
| Mampu memahami Pemecahan Masalah, Representasi Pengetahuan, Sistem Pakar, Pengolahan Bahasa Alami, Ketidakpastian, Logika Fuzzy, Jaringan Syaraf Tiruan, Searching, Planning (C2); Memahami berbagai macam algoritma kecerdasan buatan dan penerapannya untuk mengatasi permasalahan dalam berbagai bidang; Mampu menganalisa teknik-teknik kecerdasan buatan yang sesuai untuk menyelesaikan permasalahan dengan penuh tanggung jawab dan etika; | | | | | | | | | | | | | |
| **Diskripsi Singkat Mata Kuliah** | |  | | | | | | | | | | | | | |
| **Materi Pembelajaran / Pokok Bahasan** | |  | | | | | | | | | | | | | |
| **Pustaka** | | **Utama :** | | | |  | | | | | | | | | |
| 1. Buku 2. E-book | | | | | | | | | | | | | |
| **Pendukung :** | | | |  | | | | | | | | | |
| 1. Open Source | | | | | | | | | | | | | |
| **Media Pembelajaran** | | **Software :** | | | | | **Hardware :** | | | | | | | | |
|  | | | | |  | | | | | | | | |
| **Nama Dosen Pengampu** | | 1. M. Hasyim Ratsanjani 2. candra bella vista 3. Kadek Suarjuna Batubulan | | | | | | | | | | | | | |
| **Matakuliah Syarat** | | (Kode Mata Kuliah - Nama Mata Kuliah) | | | | | | | | | | | | | |
| **Minggu Ke** | **Kemampuan Akhir Yang Direncanakan**  **(Sub-CP-MK)** | | **Bahan kajian**  **(Materi Pembelajaran)** | | **Bentuk dan Metode Pembelajaran** | | | **Estimasi Waktu** | | **Pengalaman Belajar Mahasiswa** | | **Kriteria & Bentuk Penilaian** | | **Indikator Penilaian** | **Bobot (%)** |
| **(1)** | **(2)** | | **(3)** | | **(4)** | | | **(5)** | | **(6)** | | **(7)** | | **(8)** | **(9)** |
| 1 | Introduction to Artificial Intelligence | | 1. What Is? 2. Why do we need to Study AI 3. Branches of AI 4. The five tribes of machine learning 5. Defining Intellegence using the turing test 6. Building rational agents 7. General Problem Solver 8. Building an intelegent agent | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab, diskusi kelompok | | Mahasiswa mampu menjelaskan konsep Introduction to Artificial Intelligence  dengan kualitas sebuah komputer dan user serta mampu menjelaskan implementasi konsep Introduction to Artificial Intelligence | 0.76 |
| 2 | Fundamental Use Cases for Artificial Intelligence | | 1. Representative AU use cases 2. Digital personal assitants and chatbots 3. Personal chauffeur 4. Shipping and warehouse management 5. Human health 6. Knowledge search 7. Recommendation Systems 8. The Smart Home 9. Gaming 10. Movie Making 11. Underwriting and deal analysis 12. Data Cleansing and transformation | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab dan tugas | | Mahasiswa mampu menjelaskan Fundamental Use Cases for Artificial Intelligence. Mahasiswa mampu menjelaskan konsep Fundamental Use Cases for Artificial Intelligence | **0.76** |
| 3 | Machine Learning Pipelines | | 1. What is a machine learning pipeline 2. Problem Definition 3. Data ingetion 4. Data preparation 5. Data segregtion 6. Model training | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab, presentasi dan pembahasan diskusi kelompok dan evaluasi hasil diskusi | | * Mahasiswa mampu menjelaskan faktor manusia yang meliputi aspek Machine Learning Pipelines * Mahasiswa mampu menjelaskan perkembangan teknologi sistem komputer, khususnya pada aspek Machine Learning Pipelines * Mahasiswa mampu menjelaskan beberapa teknologi sistem komputer yang ditujukan bagi user dengan kebutuhan khusus. | **0.76** |
| 4 | Feature Selection and Feature Engineering | | 1. Feature selection 2. Feature engineering 3. Outliner management 4. One-hot encoding 5. Log transform 6. Scaling 7. Date Manipulation 8. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab, diskusi | | Mahasiswa mampu menjelaskan dan merinci tentang konsep dasar Feature Selection and Feature Engineering | **0.76** |
| **5** | Quis 1 | | Jurnal Presntation | | Presentation | | | **2 SKS / 4 Jam** | | Quiz 1 | | Quiz 1 | | Quiz 1 | **20** |
| 6 | Classification and Regression Using Supervised Learning | | 1. Supervised versus unsupervised learning 2. What is classification 3. Preprocessing data 4. Label encoding 5. Logistic regression classifier 6. The Naïve Bayes Classifier 7. Confusion matrixes 8. Support vector machines 9. Classifying income data using Support vektor machines 10. What is regression? 11. Building a single-variable regressor 12. Building a multivarible regressor 13. Estimating housing prices using a Support Vector Regressor 14. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab, diskusi | | Mahasiswa dapat menjelaskan Classification and Regression Using Supervised Learning | **0.76** |
| 7 | Predictive Analytics with  Ensemble Learning | | 1. What is unsupervised learning? 2. What is ensemble learning? 3. What are random forests and extremely random random forest? 4. Dealing with class imbalance 5. Finding optimal training parameters using grid search 6. Computing relative feature importance 7. Predicting traffic using an extremely random forest regressor 8. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab dan diskusi kelompok | | Mahasiswa dapat menjelaskan interaksi user dengan system dan menganalisis Predictive Analytics with  Ensemble Learning  yang buruk dan baik | **0.76** |
| **8** | Detecting Patterns with Unsupervised Learning | | 1. What is unsupervised learning? 2. Clustering data with the K-Means algorithm 3. What are Gaussian Mixture Models 4. Finding subgroups in stock market using the Affinity 5. Propagational Model 6. Segmenting the market based on shopping patterns 7. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | UTS | | UTS | | Mahasiswa mampu  menjelaskan prinsip-  prinsip Detecting Patterns with Unsupervised Learning yang baik, mampu  menerapkannya secara  praktis dalam konteks  Detecting Patterns with Unsupervised Learning sistem komputer. | **0.76** |
| 9 | UTS | | Essai | |  | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab dan diskusi kelompok | | **UTS** | **25** |
| 10 | Logic Programming | | 1. What is logic programming 2. Understanding the building blocks of logic programming 3. Solving problems using logic programming 4. Installing Python packages 5. Matching mathematical expressions 6. Validating primes 7. Parsing a family tree 8. Analyzing geography 9. Building a puzzle solver 10. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab dan diskusi kelompok | | Mahasiswa mampu  Merancang dan menjelaskan prinsip-  prinsip Logic Programming  yang baik, mampu  menerapkannya secara  praktis dalam konteks  perancangan Logic Programming. | **0.76** |
| **11** | Heuristic Search Techniques | | 1. Is heuristic search artificial intelligence? 2. What is heuristic seacrh? 3. Contraint satisfaction problems 4. Local search techniques 5. Constructing a string using greedy search 6. Solving a problem with contraints 7. Solving the region-coloring problem 8. Building an 8-puzzle solver 9. Building a maze solver 10. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab dan diskusi kelompok | | Menjelaskan konsep  pembagian task dalam  konteks perancangan  Heuristic Search Techniques, mampu  melakukan pembagian  task secara efektif dalam rangka menghasilkan  Heuristic Search Techniques yang  berdaya guna optima | **0.76** |
| 12 | Natural Language Processing | | 1. Introduction and installation of packages 2. Tokenizing text data 3. Converting words to their base forms using stemming 4. Converting words to their base forms using lemmatization 5. Dividing text data into chunks 6. Extracting the frequency of terms using the Bag of words model 7. Building a category predictor 8. Constructing a gender identifier 9. Building a sentiment analizyer 10. Topic modeling using latent dirichlet allocation 11. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab  dan diskusi  kelompok | | Mahasiswa mampu menjelaskan jenis Natural Language Processing  dll | **0.76** |
| 13 | Sequential Data and Time Series Analysis | | 1. Understanding sequential data 2. Handling time series data with Pandas 3. Slicing time series data 4. Operation on time series data 5. Extracting statistics from time series data 6. Generiting data using Hidden Markov Models 7. Identifying alphabet sequences with Conditional Random Fields 8. Stock market analysis 9. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab  dan diskusi  kelompok | | Mahasiswa mampu  menjelaskan konsep  Sequential Data and Time Series Analysis beserta  variasi bentuknya,  mampu menjelaskan  Sequential Data and Time Series Analysis  g dan mengimplemantasikan nya dalam Sequential Data and Time Series Analysis | **0.76** |
| 14 | QUIS 2 | | Literatur review (2 Orang)  Minimal 10 Paper internasional | | Presentation | | | **2 SKS / 4 Jam** | | Latihan dan Tanya jawab | | Tanya jawab, diskusi | | Quis 2 | **20** |
| 15 | Neural Networks | | 1. Introduction to neural networks 2. Building a preceptron-based classifier 3. Constructing a single-layer neural network 4. Contructing a multi-layer neural network 5. Building a vector quantizer 6. Analyzing sequintial data using recurrent neural networks 7. Visualizing chacacters in an optical character recognation database 8. Building an optical character recognition engine 9. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab, diskusi | | Mahasiswa mamou menjelaskan jenis kesalahan dan mendokumentasikan kesalahan dalam Neural Networks | **0.76** |
| 16 | Recurrent Neural  Networks and Other  Deep Learning Models | | 1. The basics of Recurrent Neural Networks 2. Architecture of RNNs 3. A language modeling use case 4. Training an RNN 5. Summary | | Teori dan Tugas | | | **2 SKS / 4 Jam** | | Ceramah, Latihan dan tugas mandiri | | Tanya jawab, diskusi kelompok dan evaluasi hasil diskusi | | Mahasiswa mampu  menjelaskan Recurrent Neural  Networks and Other  Deep Learning Models.  Mahasiswa mampu  menjelaskan k Recurrent Neural  Networks and Other  Deep Learning Models,  dan mampu  melaksanakannya dalam  Recurrent Neural  Networks and Other  Deep Learning Models. | **0.76** |
| **17** | Uas | | Pilihan Ganda | | **Ujian.jti.polinema.ac.id** | | | **2 SKS / 4 Jam** | | UAS | | UAS | | **UAS** | **25** |

**Keterangan :**

**RENCANA PENILAIAN DAN EVALUASI**

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| --- | --- | --- | --- | --- |
| **Minggu Ke** | **Sub-CP-MK** | **Pokok Bahasan** | **Bentuk Penilaian** | **Bobot** |
| 1 |  |  |  | Tugas 1: %  Tugas 2: %  Tugas 3: %  Tugas 4: %  Tugas 5: %  Tugas 6: %  Quiz 1: %  UTS: % |
| 2 |  |  |  |
| 3 |  |  |  |
| **4** | **Quiz 1** | | |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
| **8** | **UTS** | | |
| 9 |  |  |  | Tugas 7: %  Tugas 8: %  Tugas 9: %  Tugas 10: %  Tugas 11: %  Tugas 12: %  Quiz 2: %  UAS: % |
| 10 |  |  |  |
| 11 |  |  |  |
| 12 |  |  |  |
| **13** | **Quiz 2** | | |
| 14 |  |  |  |
| 15 |  |  |  |
| 16 |  |  |  |
| **17** | **UAS** | | |
| **TOTAL BOBOT** | | | | **100%** |

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|  | **POLITEKNIK NEGERI MALANG**  **JURUSAN TEKNOLOGI INFORMASI**  **PROGRAM STUDI : D4 TEKNIK INFORMATIKA** | | | | | |
| **METODE PENILAIAN** | | | | | | |
| **MATA KULIAH** |  | | | | | |
| **KODE** |  | **BOBOT (sks) / jam** |  | | **SEMESTER** |  |
| **DOSEN PENGAMPU** | (Nama Dosen Pemberi Tugas) | | | | | |
| **BENTUK PENILAIAN** | | | | | | |
| Tugas 1 | | | | | | |
| **JUDUL PENILAIAN** | | | | | | |
| (judul sesuai dengan yang dituliskan di rencana penilaian dan evaluasi pada tabel sebelumnya) | | | | | | |
| **SUB CAPAIAN PEMBELAJARAN MATA KULIAH** | | | | | | |
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| **DESKRIPSI** | | | | | | |
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| **METODE PENGERJAAN** | | | | | | |
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| **BENTUK FORMAT LUARAN** | | | | | | |
| 1. Obyek Pekerjaan: 2. Bentuk Luaran: | | | | | | |
| **INDIKATOR, KRITERIA, DAN BOBOT PENILAIAN** | | | | | | |
| (Indikator) : %  Bobot penilaian Tugas 1 adalah % dari 100% penilaian mata kuliah ini | | | | | | |
| **JADWAL PELAKSANAAN** | | | | | | |
| (waktu pemberian tugas) | | | | (durasi pengerjaan) | | |
| **LAIN-LAIN YANG DIPERLUKAN:** | | | | | | |
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| **PUSTAKA** | | | | | | |
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|  | **POLITEKNIK NEGERI MALANG**  **JURUSAN TEKNOLOGI INFORMASI**  **PROGRAM STUDI : D4 TEKNIK INFORMATIKA** | | | | | |
| **METODE PENILAIAN** | | | | | | |
| **MATA KULIAH** |  | | | | | |
| **KODE** |  | **BOBOT (sks) / jam** |  | | **SEMESTER** |  |
| **DOSEN PENGAMPU** | (Nama Dosen Pemberi Quiz) | | | | | |
| **BENTUK PENILAIAN** | | | | | | |
| Quiz 1 | | | | | | |
| **JUDUL PENILAIAN** | | | | | | |
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| **SUB CAPAIAN PEMBELAJARAN MATA KULIAH** | | | | | | |
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| **DESKRIPSI** | | | | | | |
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| **METODE PENGERJAAN** | | | | | | |
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| **BENTUK FORMAT LUARAN** | | | | | | |
| 1. Obyek Pekerjaan: 2. Bentuk Luaran: | | | | | | |
| **INDIKATOR, KRITERIA, DAN BOBOT PENILAIAN** | | | | | | |
| (indikator) : 100%  Bobot penilaian Quiz 1 adalah % dari 100% penilaian mata kuliah ini | | | | | | |
| **JADWAL PELAKSANAAN** | | | | | | |
| (waktu pelaksanaan) | | | | (durasi pengerjaan) | | |
| **LAIN-LAIN YANG DIPERLUKAN:** | | | | | | |
|  | | | | | | |
| **PUSTAKA** | | | | | | |
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