#### TELKOM UNIVERSITY  SAP Jaringan Komunikasi Data

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| **Course Catalog Description** | : | Jaringan komunikasi data membahas proses komunikasi data antar komputer melalui jaringan komunikasi data. Proses komunikasi melibatkan arsitektur protokol OSI & TCP/IP yang didalamnya dijelaskan aturan, mekanisme dan kemampuan protokol setiap layer. Jaringan komunikasi disusun atas berbagai media transmisi dan perangkat jaringan yang memiliki karakteristik tersendiri. |
| **Pre-Requisite Courses** | : | Jaringan dan Teknik Penyambungan Telekomunikasi |
| **Textbook & Materials** | : | Stallings William, Data and Computer Communications, Macmillan Publishing Company, New York, 1993 |
| **Program Learning Outcome (Capaian Pembelajaran Program Studi)** | : | 1. Mempunyai kemampuan untuk menggunakan pengetahuan dasar matematika, sains, dan rekayasa 2. Mempunyai kemampuan merancang dan melaksanakan eksperimen, termasuk menganalisis dan menginterpretasikan data menggunakan metoda dan etika ilmiah 3. Mempunyai kemampuan merancang suatu sistem, komponen, atau proses termasuk pengiriman konten broadband melalui metoda rekayasa di bidang telekomunikasi 4. Mempunyai kemampuan untuk berkomunikasi secara efektif baik lisan maupun tulisan dengan menggunakan bahasa indonesia dan bahasa inggris 5. Mempunyai keterampilan dalam mengoperasikan perangkat keras dan menggunakan aplikasi perangkat lunak yang berkaitan dengan teknologi informasi dan telekomunikasi. |
| **Course Learning Outcomes (Capaian Pembelajaran MK)** | : | 1. Mahasiswa memahami prinsip kerja komunikasi data dalam arsitektur protokol OSI dan TCP/IP  2. Mahasiswa memahami kemampuan perangkat dan elemen jaringan penyusun komunikasi data  3. Mahasiswa mampu merancang sebuah jaringan skala LAN dengan parameter efektifitas pengalamatan, routing dan penggunaan perangkat jaringan.  4. Mahasiswa mampu mensimulasikan hasil rancangan jaringan LAN dengan evaluasi berdasarkan QoS |
| **Assessment Percentage** | : | UTS (30%)  UAS (30%)  Lainnya (40%) |

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| **Outcome** | **Level** | **Proficiency assessed by** |
| Bertaqwa kepada Tuhan Yang Maha Esa dan mampu menunjukkan sikap religius | None |  |
| Mempunyai pengetahuan dan kemampuan untuk menggunakan ilmu dasar matematika, sains, dan rekayasa | Highly Rated | Presentasi (ppt atau tulisan), UTS, UAS |
| Mempunyai kemampuan merancang suatu sistem, komponen, atau proses untuk memenuhi kebutuhan yang diharapkan dalam batasan-batasan realistis termasuk pengiriman konten broadband melalui metoda rekayasa dibidang telekomunikasi | Highly Rated | Presentasi (ppt atau tulisan), UTS, UAS |
| Mempunyai kemampuan merancang dan melaksanakan eksperimen, termasuk menganalisis dan menginterpretasikan data secara ilmiah menggunakan metoda ilmiah | Highly Rated | Presentasi (ppt atau tulisan), UTS, UAS |
| Mempunyai kemampuan untuk mengidentifikasi, memformulasi, dan menyelesaikan permasalahan rekayasa telekomunikasi | None |  |
| Mempunyai keterampilan dalam mengoperasikan perangkat keras, menggunakan aplikasi perangkat lunak dan kemampuan pemrograman yang berkaitan dengan teknologi informasi dan telekomunikasi | Highly Rated | Presentasi (ppt atau tulisan), UTS, UAS |
| Mempunyai kemampuan untuk berkomunikasi secara efektif baik lisan maupun tulisan | Highly Rated | Presentasi (ppt atau tulisan), UTS, UAS |
| Kemampuan merencanakan menyelesaikan dan mengevaluasi tugas di dalam batasan-batasan yang ada | None |  |
| Mampu menunjukkan sikap peran serta dalam kelompok kerja multi disiplin dan lintas budaya | None |  |
| Mampu menunjukkan sikap bertanggung jawab yang sesuai dengan etika profesi | None |  |
| Mampu memahami kebutuhan akan pembelajaran sepanjang hayat termasuk akses terhadap isu-isu mutakhir di bidang telekomunikasi dan wawasan kewirausahaan | None |  |

**Typical Topics Covered on a Week by Week Basis**

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| **Week 1** | 1. Converged network architecure (rules, things must be considered : scalability, quality, fault tolerance, security)  2. Network scale (LAN, WAN, MAN)  3. Overview packet switch (OSI & TCP/IP)  4. Interaction between layers (encapsulation)  5. Message delivery process (application to application between end-nodes)  6. Review Switching Concept (Circuit Switch, Packet Switch, & Virtual Circuit) |
| **Week 2** | 1. Converged network architecure (rules, things must be considered : scalability, quality, fault tolerance, security)  2. Network scale (LAN, WAN, MAN)  3. Overview packet switch (OSI & TCP/IP)  4. Interaction between layers (encapsulation)  5. Message delivery process (application to application between end-nodes)  6. Review Switching Concept (Circuit Switch, Packet Switch, & Virtual Circuit) |
| **Week 3** | (1)  1. Converged network architecure (rules, things must be considered : scalability, quality, fault tolerance, security)  2. Network scale (LAN, WAN, MAN)  3. Overview packet switch (OSI & TCP/IP)  4. Interaction between layers (encapsulation)  5. Message delivery process (application to application between end-nodes)  6. Review Switching Concept (Circuit Switch, Packet Switch, & Virtual Circuit)  (2)  1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control |
| **Week 4** | (1)  1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control  (2)  1. Functions  2. Protocols & services example  3. Client server model  4. Protocols & services example (http, dns, smtp, pop, telnet, ftp, dhcp)  5. Data Capacity : QoS |
| **Week 5** | 1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control |
| **Week 6** | 1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control |
| **Week 7** | 1. Bit Error Rate (BER)  2. Protocols framing : ethernet, WiFi  3. IPv4 Subnetting  4. IPv4 address planning in LAN : VLSM & Non VLSM  5. Routing protocols (distance vector & link state, IGP & BGP, RIPv1, RIPv2, OSPF, dll)  6. Create and read routing table |
| **Week 8** | 1. Bit Error Rate (BER)  2. Protocols framing : ethernet, WiFi  3. IPv4 Subnetting  4. IPv4 address planning in LAN : VLSM & Non VLSM  5. Routing protocols (distance vector & link state, IGP & BGP, RIPv1, RIPv2, OSPF, dll)  6. Create and read routing table |
| **Week 9** | 1. Bit Error Rate (BER)  2. Protocols framing : ethernet, WiFi  3. IPv4 Subnetting  4. IPv4 address planning in LAN : VLSM & Non VLSM  5. Routing protocols (distance vector & link state, IGP & BGP, RIPv1, RIPv2, OSPF, dll)  6. Create and read routing table |
| **Week 10** | 1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control |
| **Week 11** | 1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control |
| **Week 12** | 1. Wired & Wireless  2. Connector & Cabling  3. Functions (LLC, MAC)  4. Media access control / metoda akses (shared media : controlled & contention-based, non shared-media)  5. Protocols framing : ethernet, WiFi  6. Framing type : header, data, triler  7. MAC addres  8. Error Detection (Pariti, CRC, Checksumm)  9. Error Control : BEC  10. ARQ  11. Error Control : FEC (error detection Block Parity, Hamming)  12. Flow control : Sliding Widow  13. Function : host to host (addressing, encapsulation, routing)  14. IP v4 (packet header fields)  15. IP v6 (packet header fields)  16. Create and read routing table  17. functions : application to application (tracking multiple communication, segmenting & reassembling, applications identification/multiplexing)  18. TCP datagrams (segment header fields, clint-server process example, connection establishment & termination)  19. UDP datagrams (segment header fields, clint-server process example)  20. Port addresssing  21. Managing Transport session : segmenting & reassembling  22. Connection establishment, connection termination  23. Managing transport session : flow control |

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| **Computer Usage** | : | Software: Packet Tracer  Hardware: PC / Laptop yang telah Packet Tracer |