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| **MATA KULIAH** | **Nama Mata Kuliah** | : Reliability, Availability, & Maintainability |
| | **Kode MK** | : VI231523 |
| | **Kredit** | : 3 SKS |
| | **Semester** | : V |

| **DESKRIPSI MATA KULIAH** |
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| MK Reliability, Availability, & Maintainability berada di semester V dengan bobot 3 sks yang terdiri dari 2 sks teori dan 1 sks praktikum. Mata kuliah Reliability, Availability, & Maintainability ini termasuk dalam rumpun mata kuliah Instrumentasi Safety. Mata kuliah ini membahas tentang penerapan metode Reliability, Availability, & Maintainability pada berbagai case permasalahan instrumentasi. Untuk dapat memahami Reliability, Availability, & Maintainability instrument di industry, mahasiswa dibekali pemahaman tentang stategi dan metode yang tepat untuk penerapan langsung terhadap studi kasus instrumentasi di berbagai sektor industri. |
| **CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBANKAN MATA KULIAH** |
| ● Mampu mengelola pembelajaran diri sendiri, dan mengembangkan diri sebagai pribadi pembelajar sepanjang hayat untuk bersaing di tingkat nasional, maupun internasional, dalam rangka berkontribusi nyata untuk menyelesaikan masalah dengan mengimplementasikan teknologi informasi dan komunikasi dan memperhatikan prinsip keberlanjutan serta memahami kewirausahaan berbasis teknologi. (CPL-3)<br>● Mampu menerapkan pengetahuan matematika, ilmu alam, dasar-dasar instrumentasi pengukuran, pengendalian dan pengamanan untuk prosedur, proses, sistem maupun metodologi teknik yang diterapkan dalam suatu proses industri. (CPL-5)<br>● Mampu merancang solusi untuk masalah teknologi dan rekayasa Instrumentasi serta dapat berkontribusi pada desain sistem, komponen maupun proses untuk memenuhi kebutuhan tertentu dengan mempertimbangkan standar keamanan, kesehatan dan keselamatan publik. (CPL-7) |

- Mampu memahami dan mengevaluasi keberlanjutan dampak pekerjaan teknologi rekayasa Instrumentasi terhadap lingkungan dan masyarakat. (CPL-11)
- Menunjukkan pengetahuan dan pemahaman tentang prinsip-prinsip manajemen teknik dan menerapkannya pada pekerjaan sendiri baik sebagai anggota maupun pemimpin dalam tim untuk mengelola proyek di lingkungan multidisiplin. (CPL-12)

**CAPAIAN PEMBELAJARAN MATA KULIAH**

- Mahasiswa mampu memahami dan menerapkan metode-metode Reliability, Availability, & Maintainability untuk menyelesaikan persoalan-persoalan dalam sistem industri.
- Mahasiswa mampu mengidentifikasi strategi-strategi dalam ketercapaian Reliability, Availability, & Maintainability dalam semua jenis peralatan Instrumentasi Industri.
- Mahasiswa mampu memahami teknik-teknik manajamen perawatan dalam berbagai case teknologi instrumentasi.
- Mahasiswa mampu memahami strategi availability performance untuk membuat kapabilitas sistem berfungsi secara efektif tanpa mengalami gangguan, kerusakan, dan kerugian lainnya.

**POKOK BAHASAN**

- Konsep RAM
- Probabilitas dan Statistika
- Distribusi Probabilitas Variabel Acak
- Konsep dan Perhitungan Reliability
- Laju Kegagalan
- Konfigurasi Sistem Reliability
- Konsep dan Perhitungan Availability
- Konsep dan Perhitungan Maintainability
- Preventive Maintenance
- Corrective Maintenance
- Predictive Maintenance
- Dokumen Installation Operation Maintenance (IOM)

**PRASYARAT**

- Standar dan Kode
- Menggambar Instrumen
- Teknik Otomasi
- Dinamika Sistem

**PUSTAKA**

Utama:

- Handbook of Reliability, Availability, Maintainability and Safety in Engineering Design, (Authors: Stapelberg, Rudolph Frederick)
- An Introduction to Reliability and Maintainability Engineering (Charles E Ebeling)

Pendukung:

- Quantitative developments in the cognitive reliability and error analysis method (CREAM) for the assessment of human performance, (Marseguerra, et al, 2006)
- Identification of Four Wheel Mobile Robot based on Parametric Modelling, IEEE Xplore.
- A method for the maintainability assessment at design stage based on maintainability attributes, IEEE Xplore.3.
- Dokumen PM Baterai & UPS PT. Pertamina Cepu

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|---|---|---|
| **COURSE** | **Course Name** | : Reliability, Availability, & Maintainability |
| | **Course Code** | : VI231523 |
| | **Credit** | : 3 SKS |
| | **Semester** | : V |

**DESCRIPTION OF COURSE**

The Reliability, Availability & Maintainability course is in semester V with a weight of 3 credits consisting of 2 credits of theory and 1 credit of practicum. The Reliability, Availability & Maintainability course is included in the Safety Instrumentation course group. This course discusses the application of the Reliability, Availability, & Maintainability methods in various cases of instrumentation problems. To be able to understand the Reliability, Availability, & Maintainability of instruments in the industry, students are equipped with an understanding of the right strategies and methods for direct application to instrumentation case studies in various industrial sectors.

**LEARNING OUTCOMES**

- Able to manage self-learning and develop oneself as a lifelong learner to compete at the national and international levels, to make a real contribution to solving problems by implementing information and communication technology and paying attention to the principles of sustainability, and understanding technology-based entrepreneurship. (CPL-3)
- Able to apply knowledge of mathematics, natural sciences, the basics of measurement instrumentation, control, and security for engineering procedures, processes, systems, and methodologies applied in an industrial process. (CPL-5)
- Able to design solutions to Instrumentation technology and engineering problems and can contribute to the design of systems, components, and processes to meet specific needs by taking into account security, health, and public safety standards. (CPL-7)

- Able to understand and evaluate the sustainability of the impact of Instrumentation engineering technology work on the environment and society. (CPL-11)
- Demonstrate knowledge and understanding of engineering management principles and apply them to one's own work as both a member and leader in a team to manage projects in a multidisciplinary environment. (CPL-12)

**COURSE LEARNING OUTCOME**

- Students can understand and apply Reliability, Availability, & Maintainability methods to solve problems in industrial systems.
- Students can identify strategies for achieving Reliability, Availability, & Maintainability in all types of Industrial Instrumentation equipment.
- Students can understand maintenance management techniques in various cases of instrumentation technology.
- Students can understand the availability performance strategy to make the system capability function effectively without experiencing interruptions, damage, and other losses.

**MAIN SUBJECT**

- RAM concept
- Probability and Statistics
- Probability Distribution of Random Variables
- Concept and Calculation of Reliability
- Failure Rate
- Reliability System Configuration
- Concept and Calculation of Availability
- Concept and Calculation of Maintainability
- Preventive Maintenance
- Corrective Maintenance
- Predictive Maintenance
- Document Installation Operation Maintenance (IOM)

**PREREQUISITES**

- Standards and Codes
- Drawing Instruments
- Automation Engineering
- System Dynamics

**REFERENCE**

Main:

- Handbook of Reliability, Availability, Maintainability and Safety in Engineering Design, (Authors: Stapelberg, Rudolph Frederick)
- An Introduction to Reliability and Maintainability Engineering (Charles E Ebeling)

Support:

- Quantitative developments in the cognitive reliability and error analysis method (CREAM) for the assessment of human performance, (Marseguerra, et al, 2006)
- Identification of Four Wheel Mobile Robot based on Parametric Modelling, IEEE Xplore.
- A method for the maintainability assessment at the design stage based on maintainability attributes, IEEE Xplore.3.
- Doc PM Baterai & UPS PT. Pertamina Cepu.