

MATA KULIAH	Nama Mata Kuliah : Termodinamika Terapan
	Kode MK : VI231315
	Kredit : 3 SKS
	Semester : III

DESKRIPSI MATA KULIAH

MK Termodinamika Terapan berada di semester III dengan bobot 3 sks. Matakuliah Termodinamika ini termasuk dalam rumpun matakuliah Basic Science di Departemen Teknik Instrumentasi FV –ITS. Mata kuliah ini membahas tentang hukum konservasi energi berdasarkan konsep hukum pertama dan kedua termodinamika, serta aplikasi termodinamika dalam siklus daya. Mata kuliah ini menjadi dasar pengetahuan dan keterampilan yang harus dimiliki bagi seorang engineer yaitu untuk memahami proses suatu sistem termodinamika, dan aplikasinya di dunia industri, sehingga engineer mampu melakukan analisis dan trouble shooting terhadap sebuah siklus daya pada sebuah plant.

CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBANKAN MATA KULIAH

- Mampu mengkaji kasus penerapan ilmu pengetahuan dan teknologi di bidang keahlian sesuai standar kompetensi kerja, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir atau bentuk kegiatan. (CPL-2)
- Mampu berkomunikasi, menulis laporan serta membuat presentasi secara efektif. (CPL-4)
- 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)
- Mampu mengidentifikasi, merumuskan, meneliti literatur dan menganalisis masalah teknik di bidang teknologi Instrumentasi untuk

mencapai kesimpulan yang dapat dibuktikan dengan menggunakan alat analisis sesuai standar disiplin ilmu teknik instrumentasi. (CPL-6)

CAPAIAN PEMBELAJARAN MATA KULIAH

- Mahasiswa mampu memahami konsep termodinamika.
- Mahasiswa mampu menjelaskan konsep termodinamika.
- Mahasiswa mampu menerapkan konsep termodinamika dalam bidang instrumentasi.
- Mahasiswa mampu menganalisis permasalahan pada penerpan konsep termodinamika dalam bidang instrumentasi.

POKOK BAHASAN

- Pegantar Termodinamika Terapan
- Hukum 0 dan 1 Termodinamika
- Konsep Keseimbangan Energi
- Penerapan Hukum Termodinamika 1
- Analisis Energi pada Kontrol Volume dan Keseimbangan Massa
- Hukum Termodinamika 2
- Performansi Siklus Energi
- Sistem Tenaga Uap
- Sistem Tenaga Gas
- Gas Turbin Power Plant

PRASYARAT

Fisika Terapan

PUSTAKA

Utama:

- Moran, M.J,H.N.Shapiro, Fundamentals of Engineering Thermodynamics, John Wiley & Sons,1998
- Boles A.Michael., Thermodynamics an Engineering Approach, Mc Graw Hill, Second Edition,1994

Pendukung:

- Doolittle, J.S., J.L.Francais Hale, Thermodynamics for Engineers, John Wiley & Sons,1991
- Holman, J.P., Thermodynamics, Mc Graw Hill,1983

COURSE	Course Name : Applied Thermodynamics
	Course Code : VI231315
	Credit : 3 SKS
	Semester : III

DESCRIPTION OF COURSE

Applied Thermodynamics course is in semester III with a weight of 3 credits. This Thermodynamics course is included in the Basic Science class in the Instrumentation Engineering Department FV –ITS. This course discusses the law of energy conservation based on the concepts of the first and second laws of thermodynamics, as well as the application of thermodynamics in the power cycle. This course forms the basis of knowledge and skills that must be possessed by an engineer, to understand the process of a thermodynamic system, and its application in the industrial world so that engineers are able to carry out analysis and troubleshooting of a power cycle in a plant.

LEARNING OUTCOMES

- Able to review cases of the application of science and technology in areas of expertise according to work competency standards, and able to make appropriate decisions from the results of their own work or group work in the form of a final project report or activity. (CPL-2)
- Able to communicate, write reports and make presentations effectively. (CPL-4)
- Able to apply knowledge of mathematics, natural sciences, the basics of measurement instrumentation, control, and security for procedures, processes, systems, and technical methodologies applied in an industrial process. (CPL-5)
- Able to identify, formulate, research literature, and analyze technical problems in the field of Instrumentation technology to reach conclusions that can be proven by using analytical tools according to standard instrumentation engineering disciplines. (CPL-6)

COURSE LEARNING OUTCOME

- Students can understand the concept of thermodynamics.
- Students can explain the concept of thermodynamics.
- Students can apply thermodynamic concepts in the field of instrumentation.
- Students can analyze problems in the application of thermodynamic concepts in the field of instrumentation.

MAIN SUBJECT

- Introduction to Applied Thermodynamics
- The 0's and 1st Laws of Thermodynamics
- Concept of Energy Balance
- Application of the Law of Thermodynamics 1
- Energy Analysis on Volume Control and Mass Balance
- Law of Thermodynamics 2
- Energy Cycle Performance
- Steam Power System
- Gas Power System
- Gas Turbine Power Plant

PREREQUISITES

Applied Physics

REFERENCE

Main:

- Moran, M.J, H.N.Shapiro, Fundamentals of Engineering Thermodynamics, John Wiley & Sons,1998
- Boles A.Michael., Thermodynamics an Engineering Approach, Mc Graw Hill, Second Edition,1994

Support:

- Doolittle, J.S., J.L.Francais Hale, Thermodynamics for Engineers, John Wiley & Sons,1991
- Holman, J.P., Thermodynamics, Mc Graw Hill,1983