

<b>MATA KULIAH</b>	<b>Nama Mata Kuliah</b> : Perpindahan Panas
	<b>Kode MK</b> : VI231421
	<b>Kredit</b> : 3 SKS
	<b>Semester</b> : IV

#### **DESKRIPSI MATA KULIAH**

MK Perpindahan Panas berada di semester IV dengan bobot 3 sks. Matakuliah Perpindahan Panas ini termasuk dalam rumpun matakuliah Basic Science di Departemen Teknik Instrumentasi FV –ITS. Mata kuliah ini membahas tentang konsep perpindahan panas serta penerapannya dalam sistem instrumentasi industri.

#### **CAPAIAN PEMBELAJARAN LULUSAN YANG DIBEBANKAN MATA KULIAH**

- 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)
- 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**

- Mampu memahami prinsip dasar tentang perpindahan panas secara konduksi, konveksi, radiasi.

- Mampu memiliki pengetahuan tentang penerapan tipe perpindahan panas di industri.
- Mampu memahami perpindahan panas secara konveksi gaya luar, gaya dalam, dan alami.
- Mampu menguasai sistem kerja, konstruksi, pengoperasian dasar Heat Exchanger (HE).
- Mampu memahami hubungan antara perpindahan panas dan massa pada sistem.

### **POKOK BAHASAN**

- Pengantar Perpindahan Panas
- Conduction Methods
- Transient Heat Conduction
- Fundamental Convection
- Eksternal Forced Convection
- Internal Forced Convection
- Natural Convection
- Boiling Methods & Boiler
- Condensation Methods & Condensor
- Heat Exchanger
- Process Design Heat Exchanger
- Mass Transfer

### **PRASYARAT**

Fisika Terapan

### **PUSTAKA**

Utama:

- Moran, M. J., H. N. Shapiro, Fundamentals of Engineering Thermodynamics, 5th Edition, John Wiley & Sons, 2006
- Boles A. Michael., Thermodynamics an Engineering Approach, Mc Graw Hill, Second Edition, 1994
- Doolittle, J. S., J.L. Francais Hale, Thermodynamics for Engineers, John Wiley & Sons, 1991
- Holman, J.P., Thermodynamics, Mc Graw Hill, 1983

Pendukung:

<b>COURSE</b>	<b>Course Name</b> : Heat Transfer
	<b>Course Code</b> : VI231421
	<b>Credit</b> : 3 SKS
	<b>Semester</b> : IV

<b>DESCRIPTION OF COURSE</b>
Heat Transfer course is in semester IV with a weight of 3 credits. This Heat Transfer course is included in the Basic Science class in the Instrumentation Engineering Department FV –ITS. This course discusses the concept of heat transfer and its application in industrial instrumentation systems.
<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"><li>● Able to communicate, write reports and make presentations effectively. (CPL-4)</li><li>● 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)</li><li>● 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)</li><li>● 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)</li></ul>
<b>COURSE LEARNING OUTCOME</b>
<ul style="list-style-type: none"><li>● Be able to understand the basic principles of heat transfer by conduction, convection, and radiation.</li><li>● Able to know the application of heat transfer types in the industry.</li><li>● Be able to understand heat transfer by external, internal, and natural convection.</li></ul>

- Able to master the work system, construction, and basic operation of the Heat Exchanger (HE).
- Be able to understand the relationship between heat and mass transfer in the system.

### **MAIN SUBJECT**

- Introduction to Heat Transfer
- Conduction Methods
- Transient Heat Conduction
- Convection Fundamentals
- External Forced Convection
- Internal Forced Convection
- Natural Convection
- Boiling Methods & Boilers
- Condensation Methods & Condensers
- Heat Exchangers
- Process Design Heat Exchangers
- Mass Transfers

### **PREREQUISITES**

Applied Physics

### **REFERENCE**

Main:

- Moran, M. J., H. N. Shapiro, Fundamentals of Engineering Thermodynamics, 5th Edition, John Wiley & Sons, 2006
- Boles A. Michael., Thermodynamics an Engineering Approach, Mc Graw Hill, Second Edition, 1994
- Doolittle, J. S., J.L.Francais Hale, Thermodynamics for Engineers, John Wiley & Sons, 1991
- Holman, J.P., Thermodynamics, Mc Graw Hill, 1983

Support: