Satuan Acara Pengajaran

ENMT802006 - Disain & Pemilihan Material

Pengajar
Prof. Dr.-Ing. Ir. Bambang Suharno
Ir. Rahmat Saptono M.Sc.Tech., Ph.D.

Tujuan Perkuliahan

1. Mahasiswa mampu menjelaskan proses pemilihan material secara sistematis dan memilih material dengan karakteristik sesuai persyaratan disain rekayasa 2. Mampu menyusun ulasan singkat dan karya tulis akademik tentang disain dan pemilihan material untuk tujuan tertentu berdasarkan studi literatur, mencakup metode pengambilan keputusan secara kuantitatif, analisis nilai dan kegagalan.

Minggu 1

Materi	I. Pengantar Pemilihan Material - Pemilihan Material sebagai Bagian Integral dari Desain Rekayasa - Peran Insinyur Metalurgi dan Material dalam Proses Pemilihan Material - Hubungan Fungsi, Geometri, Material dan Process
Media	LCD Projector White Bord
Referensi	(1) "Overview of the Materials Selection Process" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park (4) "Chapter 11 Materials Selection" p.475-513 in Engineering Design, McGraw-Hill, New York. (5) "Chapter 2 The Design Process" in Materials Selection in Mechanical Design, Butterworth-Heinemann, Oxford (6) "Chapter 9 Materials Selection Process" in Materials and Process Selection for Engineering Design, CRC Press, Boca Raton. (7) "Part I Quantitative Methods of Materials Selection" in Selection and Use of Engineering Materials, Butterworth-Heinemann, Oxford.

Aktivitas	- Kuliah Mimbar Pembuka (50') - Pemutaran Video (10') - Studi Kasus 1 Pemilihan Material Screw Driver (10') - Diskusi Studi Kasus 1 (30') - Studi Kasus 2 Pemilihan Material Exhaust System (10') - Diskusi Studi Kasus 2 (30') - Kuliah Mimbar Penutup (10')

Minggu 2

Materi	II. Material dan Sifat-sifatnya - Klasifikasi dan Sifat-sifat Material - Basis Data Material (Material Database) - Diagram Material (Material Chart)
Media	LCD Projector White Board
Referensi	(1) "Materials Property Charts" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park. (5) "Chapter 3 Engineering Materials and Their Properties" in Materials Selection in Mechanical Design, Butterworth-Heinemann, Oxford (5) "Chapter 4 Materials Property Chart" in Materials Selection in Mechanical Design, Butterworth-Heinemann, Oxford
Aktivitas	- Kuliah Mimbar (60') - Pemutaran Video (30') - Demo Perangkat Linak Cambridge Engineering Selector (30') - Penjelasan Tugas (30')

Minggu 3

Materi	III. Metode Indeks Kinerja Material - Analisis Fungsi, Pembatas, dan Tujuan Pemilihan Material - Pemilahan Material (Screening) - Batas Sifat (Property Limit) - Pemeringkatan Material (Ranking) - Indeks Kinerja Material (Materials Performance Indices)
Media	LCD Projector White Board

Referensi	(1) "Performance Indices" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park. (5) "Chapter 5 The Basics" in Materials Selection in Mechanical Design, Butterworth-Heinemann, Oxford. (6) "Chapter 9 Materials Selection Process" in Materials and Process Selection for Engineering Design, CRC Press, Boca Raton. (7) "Part I Quantitative Methods of Materials Selection" in Selection and Use of Engineering Materials, Butterworth-Heinemann, Oxford.
Aktivitas	- Kuliah Mimbar (60') - Studi Kasus Pemilihan Material (60') - Kuliah Mimbar (30')

Minggu 4

Materi	IV. Metode Matriks Pengambilan Keputusan - Kandidat Material, Kriteria, dan Bobot. - Metode Pugh (Controlled Convergence) - Metode Dominic - Metode Pahl and Beitz. - Metode Function Tree - Metode Binary Logic
Media	LCD Projector White Board
Referensi	(1) "Decision Matrices in Materials Selection" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park
Aktivitas	- Kuliah Mimbar (60') - Studi Kasus Pemilihan Material (60') - Kuliah Mimbar (30')

Minggu 5

Materi	V. Analisis Kegagalan dan Analisis Nilai dalam Pemilihan Material - Analisis Kegagalan dalam Pemilihan Material - Analisis Nilai dalam Pemilihan Material
Media	LCD Projector White Board

Referensi	1. "Failure Analysis in Materials Selection" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park 1. "Value Analysis in Materials Selection" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park
Aktivitas	- Kuliah Mimbar (50') - Pemutaran Video (10') - Studi Kasus Kegagalan Material dalam Desain (20') - Kuliah Mimbar (50') - Pemutaran Video (10') - Penjelasan Tugas (10')

Minggu 6

Materi	VI. Hubungan Pemilihan Material dan Proses Manufaktur, Pemilihan Material untuk Tujuan Tertentu - Material dan Proses Manufaktur - Pemilihan Material untuk Proses Manufaktur - Pemilihan Material untuk Korosi
Media	LCD Projector White Board
Referensi	1. "Relationship between Materials Selection and Process" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park 4. "Design with Materials" in Engineering Design, McGraw-Hill, New York. 6. "Interaction of Materials Selection, Design, and Manufacturing Process" in Materials and Process Selection for Engineering Design, CRC Press, Boca Raton. 1. "Design for Corrosion Resistance" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park 1. "Design for High Temperature Applications" in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park 1. "SCC and HC" in Engineering Design, McGraw-Hill, New York in ASM Handbook Volume 20, Materials Selection and Design, ASM International, Metal Park
Aktivitas	- Kuliah Mimbar (50') - Diskusi Studi Kasus (30') - Kuliah Mimbar (50') - Penjelasan Tugas (20')

Minggu 7

Materi	VII. Issue dan Perkembangan Terkini dalam Proses Pemilihan Material - Issue Lokal dan Global dalam Pemilihan Material - Penggunaan Perangkat Lunak dan dalam Proses Pemilihan Material
Media	LCD Projector White Board
Referensi	"Sustainability Issue in Design Materials Selection" "Cambridge Engineering Selector"
Aktivitas	- Demo Perangkat Lunak Cambridge Engineering Selector. (60') - Pemutaran Video Kuliah Mimbar Tamu (60')

Minggu 8

Materi	Penyusunan Karya Tulis Akademik - Penulisan Teknis Bidang Rekayasa (Technical Writing in Engineering) - Penulisan dan Presentasi Akademis (Academic Writing and Presentation)
Media	LCD Projector White Board
Referensi	10. Kenneth G. Budinsky, Engineer?s Guide to Technical Writing, ASM International, Metal Park. 11. Michael F. Ashby, How to Write a Paper, Engineering Department, Cambridge.
Aktivitas	- Kuliah Mimbar(60') - Diskusi (60')