



# Satuan Acara Pengajaran

ENMT801002 - Material Teknik

Pengajar

*Ir Amin Suhadi M.Eng., Ph.D.*

## Tujuan Perkuliahan

mahasiswa diharapkan memahami tentang dasar filosofi material sehingga mampu mengatasi setiap persoalan tentang material di segala bidang industry dan pertambangan serta mampu untuk membuat inovasi tentang perkembangan material baru dalam rangka menunjang kemajuan teknologi

## Minggu 1

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**Materi** introduction,  
strategy of learning materials science  
the role of materials in technology development  
atomic structure and configuration

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**Media** LCD Projector

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**Referensi** Robert W Cahn and Peter . Hasen, Physical Metallurgy, Fourth, Revised  
Enhanced Edition, Vol. I, 1996  
Askeland D.R, Phule P.P, THE SCIENCE AND ENGINEERING OF  
MATERIALS, Thompson, 2006

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**Aktivitas** lecture  
discussion  
problem solving  
assignment determination

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## Minggu 2

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**Materi** atomic bonding  
bonding system and effect to the properties of materials  
crystal structure  
effect of crystal structure on properties

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**Media** LCD projector  
white board

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**Referensi** Robert W Cahn and Peter . Hasen, Physical Metallurgy, Fourth, Revised  
Enhanced Edition, Vol. I, 1996  
Askeland D.R, Phule P.P, THE SCIENCE AND ENGINEERING OF  
MATERIALS, Thompson, 2006

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**Aktivitas** lecture  
discussion  
problem solving  
assignment presentation

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### Minggu 3

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**Materi** crystal defect and its effect on properties  
micro structure and the role of microstructure on determining material  
characteristics

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**Media** LCD Projector  
white board

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**Referensi** Askeland D.R, Phule P.P, THE SCIENCE AND ENGINEERING OF  
MATERIALS, Thompson, 2006  
Dieter GE, Mechanical Metallurgy, Mc.Grawhill, 2006

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**Aktivitas** lecture  
discussion problem solving  
assignment presentation

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### Minggu 4

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**Materi** material selection ferrous  
gray cast iron  
white cast iron  
malleable iron ductile iron  
austenitic ductile iron

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**Media** LCD projector  
white board

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**Referensi** Ashby M.F., MATERIALS SELECTION IN MECHANICAL DESIGN,  
Butterworth, oxford, 2000  
ASM Metals Hand book vol.1, PROPERTIES AND SELECTION: iron, Steel  
and High performance Alloy

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**Aktivitas** lecture  
discussion  
problem solving  
presentation of assignment

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## Minggu 5

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**Materi** classification of steel  
steel code number  
specification of steel  
characteristics of special steel

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**Media** LCD projector  
white board

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**Referensi** Ashby M.F., MATERIALS SELECTION IN MECHANICAL DESIGN,  
Butterworth, oxford, 2000  
ASM Metals Hand book vol.1, PROPERTIES AND SELECTION: iron, Steel  
and High performance Alloy

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**Aktivitas** Lecture  
discussion  
problem solving  
presentation of assignment

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## Minggu 6

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**Materi** carbon steel  
low carbon steel  
high carbon steel  
characteristics of carbon steel

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**Media** LCD Projector  
white board

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**Referensi** Ashby M.F., MATERIALS SELECTION IN MECHANICAL DESIGN,  
Butterworth, oxford, 2000  
ASM Metals Hand book vol.1, PROPERTIES AND SELECTION: iron, Steel  
and High performance Alloy

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**Aktivitas** Lecture  
Discussion  
problem solving  
assignment presentation

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## Minggu 7

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**Materi** low alloy steel  
high alloy steel  
tool steel  
characteristic of alloy steel

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**Media** LCD Projector  
white board

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**Referensi** Ashby M.F., MATERIALS SELECTION IN MECHANICAL DESIGN,  
Butterworth, oxford, 2000  
ASM Metals Hand book vol.1, PROPERTIES AND SELECTION: iron, Steel  
and High performance Alloy

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**Aktivitas** Lecture  
discussion  
problem solving  
presentation of assignment

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## Minggu 8

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**Materi** Ujian Tengah Semester UTS

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**Media** Laptop  
kertas ujian  
alat tulis

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**Referensi** lecture materials  
reference book  
journal

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**Aktivitas** problem solving  
quiz on academic knowledge

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## Minggu 9

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**Materi** stainless steel selection  
austenitic SS  
Ferritic SS  
Duplex SS  
HP modified

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**Media** LCD Projector  
white board

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**Referensi** ASM Metals Hand book vol.1, PROPERTIES AND SELECTION: iron, Steel and High performance Alloy  
Dieter GE, Mechanical Metallurgy  
Ashby M.F., MATERIALS SELECTION IN MECHANICAL DESIGN, Butterworth, oxford, 2000

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**Aktivitas** Lecture  
discussion  
problem solving  
presentation of assignment

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## Minggu 10

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**Materi** material selection of non ferrous  
aluminium alloy  
copper alloy  
nickel alloy  
chromium alloy

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**Media** LCD projector  
white board

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**Referensi** ASM Metals Hand book vol.2, PROPERTIES AND SELECTION: Non Ferrous Alloy and Special Purpose Material  
Askeland D.R,Phule P.P, THE SCIENCE AND ENGINEERING OF MATERIALS, Thompson, 2006  
Dieter GE, Mechanical Metallurgy

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**Aktivitas** lecture  
discussion  
problem solving  
presentation of assignment

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## Minggu 11

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**Materi** advance material  
shape memory alloy  
bio degradable material

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**Media** LCD projector  
white board

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**Referensi** Callister, W.D., Materials Science and Engineering: An Introduction, 6th ed.,  
John Wiley & Sons, 1998  
Journal of advanced Material Journal of Material Science

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**Aktivitas** lecture  
problem solving  
discussion  
assignment presentation

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## Minggu 12

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**Materi** engineering ceramic  
properties of ceramic  
advantage and disadvantage

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**Media** LCD Projector  
white board

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**Referensi** Callister, W.D., Materials Science and Engineering: An Introduction, 6th ed.,  
John Wiley & Sons, 1998  
Dieter GE, Mechanical Metallurgy

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**Aktivitas** lecture  
discussion  
quiz  
assignment presentation

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## Minggu 13

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**Materi** engineering polymer  
structure and properties of engineering polymer  
application of polymer

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**Media** LCD Projector  
white board

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**Referensi** Askeland D.R, Phule P.P, THE SCIENCE AND ENGINEERING OF MATERIALS, T Callister, W.D., Materials Science and Engineering: An Introduction, 6th ed., John Wiley & Sons, 1998  
Journal of polymer

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**Aktivitas** Lecture  
discussion  
problem solving  
assignment presentation

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## Minggu 14

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**Materi** development of composite materials  
properties of composite  
role of composite in engineering development  
application of composite

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**Media** LCD projector  
white board

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**Referensi** Callister, W.D., Materials Science and Engineering: An Introduction, 6th ed., John Wiley & Sons, 1998  
Journal of advanced Material  
Journal of Material Science

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**Aktivitas** lecture  
discussion  
problem solving  
presentation of assignment

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## Minggu 15

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**Materi** cellular material  
the role of cellular material in engineering problem  
properties of cellular material  
development of cellular material  
application of cellular material

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**Media** LCD Projector  
white board

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**Referensi** Callister, W.D., Materials Science and Engineering: An Introduction, 6th ed., John Wiley & Sons, 1998  
Journal of advanced Material  
Journal of Material Science

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**Aktivitas**    lecture  
                  assignment presentation  
                  discussion  
                  problem solving

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## Minggu 16

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**Materi**        Ujian Akhir Semester UAS

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**Media**        laptop  
                  testing paper  
                  alat tulis

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**Referensi**    all of lectures materials  
                  reference book  
                  journal

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**Aktivitas**    testing

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