



# Satuan Acara Pengajaran

ENMT801104 - Mekanika Material

Pengajar

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## Tujuan Perkuliahan

Mahasiswa mampu menjelaskan teori dasar perilaku mekanika bahan dan mengaplikasikan metode rekayasa analisis dan prediktif pada desain, pemilihan, dan pengujian material untuk mencegah kegagalan karena deformasi, patah, dan lelah.

## Minggu 1

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**Materi** Introduction  
- Types of Materials Failure  
- Technological Challenge and Economic of Fracture  
- Materials Selection for Engineering Component

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**Media** - LCD Projector  
- White Board

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**Referensi** Norman E. Dowling, Mechanical Behavior of Materials, Engineering Methods for Deformation Fracture and Fatigue (NED)  
Chapter 1.1,1.2,1.3,1.4,1.5,3.8

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**Aktivitas**

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## Minggu 2

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**Materi** Mechanical Testing of Materials  
- Tension Testing  
- Stress Strain Properties  
- Trends in Tensile Behavior

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 4.1, 4.2, 4.3, 4.4

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**Aktivitas** - Lecture Talk  
- Discussion

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### Minggu 3

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**Materi** Stress Strain Relationship and Behavior  
- Models for Deformation Behavior  
- Elastic Deformation

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 5.1, 5.2, 5.3

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**Aktivitas** - Lecture Talk  
- Discussion

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### Minggu 4

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**Materi** States of Stress and Strain  
- Plane Stress  
- Principal Stress  
- Three Dimensional States of Stress  
- Stresses on the Octahedral Plane  
- Complex States of Strain

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 6.1, 6.2, 6.3, 6.4, 6.5, 6.6

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**Aktivitas** - Lecture Talk  
- Discussion

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### Minggu 5

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**Materi** Yielding and Fracture under Combined Stresses  
- General Form of Failure Criteria  
- Maximum Normal Stress Fracture Criterion  
- Maximum Shear Stress Yield Criterion  
- Octahedral Shear Stress Yield Criterion

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 7.1, 7.2, 7.3, 7.4, 7.5, 7.6

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**Aktivitas** - Lecture Talk  
- Discussion

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## Minggu 6

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**Materi** Fracture Mechanics  
- Preliminary Discussion  
- Mathematical Concepts  
- Application of K to Design and Analysis  
- Fracture Toughness Values and Trends

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 8.1, 8.2, 8.2, 8.4, 8.5, 8.6

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**Aktivitas** - Lecture Talk  
- Group Discussion

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## Minggu 7

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**Materi** REVIEW (Mid Term Preparation)

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**Media** - LCD Projector  
- White Board

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**Referensi** - NED Chapter 1, 4, 6, 7, 8

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**Aktivitas** - Lecture

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## Minggu 8

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**Materi** MIDTERM TEST

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**Media**

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**Referensi**

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**Aktivitas**

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Minggu 9

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**Materi**      Fatigue of Materials  
                 - Definitions and Concepts  
                 - Sources of Cyclic Loading

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**Media**        - LCD Projector  
                 - White Board

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**Referensi**    NED Chapter 9.1, 9.2, 9.3

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**Aktivitas**    - Lecture Talks  
                 - Discussion

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Minggu 10

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**Materi**        Fatigue Crack Growth  
                 - Preliminary Discussion  
                 - Fatigue Crack Growth Rate Testing  
                 - Effect of R on Fatigue Crack Growth  
                 - Trends in Fatigue Crack Growth Behavior  
                 - Life Estimates for Constant Amplitude Loading  
                 - Design Consideration  
                 - Environmental Crack Growth

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**Media**        - LCD Projector  
                 - White Board

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**Referensi**    NED Chapter 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.8, 11.10

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**Aktivitas**    - Lecture Talk  
                 - Discussion

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Minggu 11

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**Materi** Creep and Damping  
- Introduction  
- Creep Testing  
- Physical Mechanism of Creep  
- Life Estimates

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 15.1, 15.2, 15.3, 15.4

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**Aktivitas** - Lecture Talk  
- Discussion

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## Minggu 12

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**Materi** Special Topics on Mechanical Behavior of Materials

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**Media** - LCD Projector

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**Referensi** Related Textbooks and Articles

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**Aktivitas** - Group Presentation  
- Discussion  
- Lecture Talk

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## Minggu 13

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**Materi** Special Topics of Mechanical Behavior of Materials

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**Media** LCD Projector

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**Referensi** Related Textbooks and Articles

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**Aktivitas** - Group Presentation  
- Discussion  
- Lecture Talk

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## Minggu 14

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**Materi** REVIEW (Final Term Preparation)

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**Media** - LCD Projector  
- White Board

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**Referensi** NED Chapter 9, 11, 15

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**Aktivitas** - Lecture Talk  
- Discussion

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