



# Satuan Acara Pengajaran

ENMT800003 - Metode Penelitian & Komputasi

Pengajar

*Nofrijon Bin Imam Sofyan Ph.D*

*Prof. Dr. Ir. Johny Wahyuadi Mudaryoto DEA.*

## Tujuan Perkuliahan

Setelah mengambil kelas ini, mahasiswa diharapkan sudah memiliki pemahaman bagaimana merencanakan proposal dan penelitian; menulis tesis dan publikasi ilmiah sesuai dengan kaedah-kaedah ilmiah; dan mengetahui sekaligus memahami bagaimana menganalisis metode komputasi untuk memecahkan suatu masalah dan desain dalam bidang teknik metalurgi dan material maupun aplikasinya.

## Minggu 1

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<b>Materi</b>	General introduction - Class information - Course content and grading - General introduction to experimental research and methodology + Experimental research + Definitions and importance of definitions + Aspect of quantifications + The purpose and principles
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<b>Media</b>	LCD Projector
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- Referensi**
1. C. R. Kothari: Research Methodology, Methods & Techniques, New Age International (P) Ltd., Publishers, New Delhi, 2004.
  2. G. Marczyk, D. DeMatteo, and D. Festinger: Essentials of Research Design and Methodology, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.
  3. J. M. Ruane: Essentials of research methods: a guide to social science research, Blackwell Publishing, Malden, 2005.
  4. L. Blaxter, C. Hughes, and M. Tight: How to Research, 3rd ed., Open University Press, Berkshire, UK, 2006.
  5. Y. K. Singh: Fundamental of Research Methodology and Statistics, New Age International (P) Ltd., Publishers, New Delhi, 2006.
  6. S.C. Chapra: Applied Numerical Methods With MATLAB for Engineers and Scientists, McGraw-Hill, Co., Boston, 2005.
  7. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.
  8. J.P. Marques de S&aacute;: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.
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**Aktivitas**

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Minggu 8

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**Materi** Midterm

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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** Introduction to computation  
- Modeling, computers, and error analysis  
- Mathematical modeling, numerical methods, and problem solving  
- Software tools

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**Media** LCD Projector

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**Referensi**

1. S.C. Chapra: Applied Numerical Methods With MATLAB for Engineers and Scientists, McGraw-Hill, Co., Boston, 2005.
2. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.
3. J.P. Marques de S&aacute;: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.

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## Aktivitas

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### Minggu 10

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**Materi** MATLAB Fundamentals  
- Basic Command  
- Logical expression  
- Vectorization  
- Introduction to Programming

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**Media** LCD Projector  
MATLAB Software

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2. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.  
3. J.P. Marques de S&aacute;acutec: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.

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**Aktivitas** Lecture  
Learning by doing

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### Minggu 11

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**Materi** MatLAB Programming  
- m-file and programming  
- Flow control if, for, while and switch  
- Algorithm, Flowchart, and Pseudocode

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**Media** LCD Projector  
MatLAB software

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**Referensi** 1. S.C. Chapra: Applied Numerical Methods With MATLAB for Engineers and Scientists, McGraw-Hill, Co., Boston, 2005.  
2. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.  
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**Aktivitas** Lecture  
Learning by doing

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### Minggu 12

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**Materi** Case study in Programming:  
- Background  
- Formulation  
- MatLAB Solution  
- Exercise

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**Media** LCD Projector  
MatLAB software

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2. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.  
3. J.P. Marques de S&aacute;acutec: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.

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**Aktivitas** Case study  
Programming

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## Minggu 13

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**Materi** Statistics and data processing analysis  
- Presenting and summarizing the data  
- Parametric tests of hypotheses  
- Statistical classification  
- Data regression

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**Media** LCD Projector

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2. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.  
3. J.P. Marques de S&aacute;acutec: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.

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**Aktivitas** Lecture

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## Minggu 14

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**Materi** Statistic with MatLAB  
- Basic statistical command  
- Hypothesis testing: z-test, t-test, two sample t-test  
- Introduction to analysis of variance

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**Media** LCD Projector  
MatLAB software  
Laptop

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**Referensi** 1. S.C. Chapra: Applied Numerical Methods With MATLAB for Engineers and Scientists, McGraw-Hill, Co., Boston, 2005.  
2. W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.  
3. J.P. Marques de S&aacute;: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.

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**Aktivitas** Lecture  
Learning by doing

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## Minggu 15

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**Materi** ANOVA with MatLAB:  
- One-way, Two-way, and n-way ANOVA  
- Case Study  
- Final Project

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**Media** LCD Projector  
Laptop  
MatLAB Software

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**Referensi** B. Hunt, R. Lipsman, J. Rosenberg, K. Coombes, J. Osborn, G. Stuck: A Guide to MATLAB for Beginners and Experienced Users, Cambridge University Press, Cambridge, UK 2001.  
S.C. Chapra: Applied Numerical Methods With MATLAB for Engineers and Scientists, McGraw-Hill, Co., Boston, 2005.  
W.Y. Yang, W. Cao, T.S. Chung, J. Morris: Applied numerical methods using MATLAB, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005.  
J.P. Marques de S&aacute;: Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Springer-Verlag Berlin Heidelberg 2007.

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**Aktivitas** Lecture  
Learning by doing

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## Minggu 16

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**Materi** Final examination

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**Media**

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**Referensi**

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