University of Miskolc
Institutional Department of Machine Tools

State Exam Questions

Mechanical Engineering MSc, CAD/CAM specialization

CAD/CAM group

iCAD Systems I.

Computer Aided NC programming

Subjects

1. Describe how to integrate the computer tools for mechanical design (advantages and disadvantages of CAD systems) ([1] *Section 1.1* and [2] *Subsection 2.2.2*)!

2. Describe the theoretical basis of parametric modelling, application and special features ([2] *Chapter 4*)!

3. Summarize the concept and properties of the feature based modelling ([2] *Section 4.3.4*)!

4. Describe the main steps of component modelling and geometric modelling and its properties ([3] *Chapter 1*)

5. Describe the principles of rapid prototyping, purposes, application areas, equipment and methods ([1] *Section 7.1* and *section 7.3-7.4*)!

6. Describe a possible grouping / partitioning of the most well-known design models, and a brief description of each model ([4] *Chapter 3*)!

7. Describe the concepts of collaborative product development ([2] *Section 2.2.5*)!

8. Summarize the solution finding methods used in methodical design ([5] *Section 3.2*)!

9. Summarize the process of computer aided NC programming! What are the main steps in the process ([6] *Chapter 6*)?

10. Compare the conventional and computer aided NC programming! What are the benefits of using CAM programs? Give examples for current CAM software ([6] *Chapter 53*, [7])!

11. What kind of engineering knowledge is needed for making NC programs? From these which can be integrated into a CAM software, and which needed the interaction of an engineer?

12. What is the main idea of the tool path generation based on 3D models? By what activities can be the automated tool path generation done?

13. Summarize the geometric information system of CNC milling machine ([6] *Chapter 15*)!

14. Summarize the steps of tool selection! How can we define a tool in a CAM software, give an example ([8])!

Compulsory readings

[1] D. Un, Solid Modeling and Applications - Rapid Prototyping, CAD and CAE Theory, Switzerland: Springer International Publishing , 2016.
[2] M. Hirz, W. Dietrich, A. Gfrerrer and J. Lang, Integrated Computer-Aided Design in Automotive Development, Berlin: Springer-Verlag, 2013.
[3] I. Storud, H. Nagy, Solid Modelling and CAD systems – How to Survibe a CAD System, London: Springer-Verlag, 2011.
[4] N. Cross, Engineering Design Methods - Strategies for Product Design (Third Edition), London: John Wiley, 2005.
[5] G. Pahl, W. Beitz, J. Feldhusen and Karl-Heinrich Grote, Engineering Design - A Systematic Approach, London: Springer-Verlag, 2007.
[6] P. Smid, CNC Programming Handbook Third Edition, New York: Industrial Press Inc., 2007.
[7] K. Apro, Secrets of 5-Axis Machining, New York: Industrial Press, 2008.
[8] *Walter Tools General Catalog.*

Recommended readings

[1] L. López de Lacalle and A. Lamikiz, Machine Tools for High Performace Machining, London: Springer-Verlag, 2009.
[2] J. P. Davim, Machining of Complex Sculptured Surfaces, London: Springer, 2012.