UNIVERSITY OF **DEBRECEN**
Doctoral School of Informatics

Major Field of Comprehensive Examination	Computer graphics and applied geometry
Syllabus	The mathematical foundations of computer graphics. Operations on vectors and matrices, eigenvalues and eigenvectors. Transformations, usage of homogeneous coordinates and quaternions. The solution of some basic intersection and fitting problems, projections. Ray tracing, root finding methods, Newton's method. Lighting and shading, texture and bump mapping. Visibility algorithms, bounding volume tests and spatial partitioning. Uniform and non-uniform B-Spline curves and surfaces, and their geometric properties. Collision detection.

Bibliography

1. E. Lengyel: Mathematics for 3D Game Programming and Computer Graphics, Cengage Learning PTR, 2011.

2. J. F. Hughes, A. van Dam, M. McGuire, D. F. Sklar, J. D. Foley, S. K. Feiner, K. Akeley: Computer Graphics: Principles and Practice, Addison-Wesley Professional, 2013.

3. G. Farin, J. Hoschek, M.-S. Kim: Handbook of Computer Aided Geometric Design, North Holland, 2002.

4. P. Shirley, M. Ashikhmin: Fundamentals of Computer Graphics, A. K. Peters/CRC Press, 2009.