

FIȘA DISCIPLINEI

1. Date despre program

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| 1.1 Instituția de învățământ superior | Universitatea de Vest din Timisoara |
| 1.2 Facultatea / Departamentul | Matematica si Informatica |
| 1.3 Catedra | Informatica |
| 1.4 Domeniul de studii | Informatica |
| 1.5 Ciclul de studii | Licenta |
| 1.6 Programul de studii / Calificarea | Computer Science : <i>Database administration / Administrator baze de date - 252101; Computer network administration / Administrator de retea de calculatoare - 252301; Analyst / Analist - 251201; Research assistant in computer science / Asistent de cercetare în informatica - 214918; Teacher in secondary schools / Profesor în învățământul gimnazial - 233002; Programmer / Programator - 251202; Software systems designers / Proiectant sisteme informatice - 251101</i> |

2. Date despre disciplină

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| 2.1 Denumirea disciplinei | Computer graphics and user interfaces | | | | | | |
| 2.2 Titularul activităților de curs | Lect. Dr. Gaianu Mihail | | | | | | |
| 2.3 Titularul activităților de seminar | Lect. Dr. Gaianu Mihail | | | | | | |
| 2.4 Anul de studiu | 3 | 2.5 Semestrul | 6 | 2.6 Tipul de evaluare | E | 2.7 Regimul disciplinei | O |

3. Timpul total estimat (ore pe semestru al activităților didactice)

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|---|-----------|--------------------|----|-----------------------|------------|
| 3.1 Număr de ore pe săptămână | 4 | din care: 3.2 curs | 2 | 3.3 seminar/laborator | 2 |
| 3.4 Total ore din planul de învățământ | 20 | din care: 3.5 curs | 10 | 3.6 seminar/laborator | 10 |
| Distribuția fondului de timp: | | | | | ore |
| Studiul după manual, suport de curs, bibliografie și notițe | | | | | 10 |
| Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate / pe teren | | | | | 10 |
| Pregătire seminarii / laboratoare, teme, referate, portofolii și eseuri | | | | | 20 |
| Tutoriat | | | | | 0 |
| Examinări | | | | | 1 |
| Alte activități..... | | | | | 0 |
| 3.7 Total ore studiu individual | 41 | | | | |
| 3.8 Total ore pe semestru | 97 | | | | |
| 3.9 Numărul de credite | 5 | | | | |

4. Precondiții (acolo unde este cazul)

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| 4.1 de curriculum | <ul style="list-style-type: none"> programming, geometry, algebra |
| 4.2 de competențe | <ul style="list-style-type: none"> basic computer skills, analitical thinking |

5. Condiții (acolo unde este cazul)

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| 5.1 de desfășurare a cursului | <ul style="list-style-type: none"> • Tablet, Google Meet, Google Classroom |
| 5.2 de desfășurare a seminarului/laboratorului | <ul style="list-style-type: none"> • Computer with OpenGL library's (Glut, freeglut) |

6. Competențele specifice acumulate

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| Comp etențe profes ionale | <ul style="list-style-type: none"> • Understanding the main principles of computer graphics • Usage of specific libraries for developing computer graphics applications. • Using third party libraries. |
| Comp etențe transv ersale | <ul style="list-style-type: none"> • Capacity to use knowledge from multiple domains and to glue them together with the aim of building a specific application. |

7. Obiectivele disciplinei (reieșind din grila competențelor specifice acumulate)

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| 7.1 Obiectivul general al disciplinei | <ul style="list-style-type: none"> • gaining knowledge about computer graphics. |
| 7.2 Obiectivele specifice | <ul style="list-style-type: none"> • understanding how the GPU and the rendering pipeline are working • knowledge of at least one graphics library • understanding that a graphics application is not just about programming but that it requires knowledge from multiple previously studied disciplines. |

8. Conținuturi

| 8.1 Curs | Metode de predare | Observații |
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| 1. Introduction. Short history of computer graphics. Lecture syllabus. | Presentation. Interactive. | During lectures students will receive several projects. They aim to consolidate their understanding of how the basic graphics algorithms |

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| | | work. These projects will count in the final course grade. |
| 2. Graphics devices for user interfacing. Rendering pipeline. Logical devices. | | |
| 3. Digital images. Image processing. Operations with images. | | |
| 4. Recap on vectors and matrices. Reference systems. Affine transformations. | | |
| 5. Drawing graphics primitives. | | |
| 6. Object modeling. Solid and procedural modeling. | | |
| 7. Projection types. | | |
| 8. Clipping algorithms for points, lines and polygons. | | |
| 9. Visibility algorithms. | | |
| 10-11. Direct and global illumination, Ray tracing. | | |
| 12. Transparency and reflection. | | |
| 13. Textures. | | |
| 14. Reality through physics and artificial intelligence. | | |
| Bibliografie 1) J. Foley, A. van Dam, S. K. Feiner, J. F. Hughes, <i>Computer Graphics: Principles and Practice in C (2nd edition)</i> , Addison Wesley, 1997, ISBN 0-201-84840-6 2) Eric Lengyel, <i>Mathematics for 3D Game Programming & Computer Graphics (3rd edition)</i> , Course Technology PTR, 2011, ISBN 978-1-4354-5886-4 3) D. Petcu, L. Cucu, <i>Grafica pe calculator</i> , Tipografia Universitatii de Vest, 1999 4) D. Petcu, L. Cucu, <i>Principii ale graficii pe calculator</i> , Excelsior, 1995 5) D. Pop, D. Petcu, <i>Modelarea Lumii Tridimensionale</i> , Eubeea, 2004 6) David. M. Mount, <i>Computer Graphics Notes</i> , University of Maryland, 2004 http://www.cs.umd.edu/~mount/427/Lects/427lects.pdf 7) Adam Finkelstein, <i>Computer Graphics Lectures</i> , Princeton University, 2003, http://www.cs.princeton.edu/courses/archive/spr03/cs426/#Textbooks 8) Paul. A. Farrell, <i>Computer Graphics Lecture Notes</i> , Kent University, 2005, http://www.cs.kent.edu/~farrell/cg05/lectures/index.html | | |
| 8.2 Seminar / laborator | Metode de predare | Observații |
| 1. Graphics APIs. Comparative study of several such APIs. Java as language for graphics applications. | Presentation. Examples. Interactive. | Students will work either individually or paired. For the assignments given at the end of each lab they must work individually. These assignments will be checked during the next lab. |
| 2. First OpenGL application. Drawing primitives (part 1). Coloring. | | |
| 3. Drawing primitives (part 2). | | |
| 4. Texturing. | | |
| 5. Small application. | | |
| 6. Simulating 3D. Depth, lighting and materials. | | |
| 7. Handling a scene through affine transformations. | | |
| 8. Loading complex 3D objects. | | |

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| 9. Small overview of what shaders are. | | |
| 10-13. WebGL | | |
| 14. Small application. | | |
| Bibliografie | | |
| 1) Dave Shreiner, <i>OpenGL Programming Guide (7th edition)</i> , Addison Wesley, 2009, ISBN 978-0-321-55262-4 | | |
| 2) Randi J. Rost, <i>OpenGL Shading Language (2nd edition)</i> , Addison Wesley, 2006, ISBN 978-0-321-33489-3 | | |
| 3) http://beta.wikiversity.org/wiki/Computer_graphics -- 2008-2009 -- info.uvt.ro | | |

9. Coroborarea conținuturilor disciplinei cu așteptările reprezentanților comunității epistemice, asociațiilor profesionale și angajatori reprezentativi din domeniul aferent programului

- The lecture will be adapted to the local market requirements. This means that the APIs will be similar with those used in the local enterprises for creating interactive applications, games, etc.

10. Evaluare

| Tip activitate | 10.1 Criterii de evaluare | 10.2 Metode de evaluare | 10.3 Pondere din nota finală |
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| 10.4 Curs | General knowledge about the terms and algorithms presented in the class. | Written exam. | 30.00% |
| | Small projects to reflect basic graphics algorithms. | Project evaluation. | 20.00% |
| 10.5 Seminar / laborator | Correctness of the assignments. | Oral assignment evaluation. | 50.00% |
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| 10.6 Standard minim de performanță | | | |
| <ul style="list-style-type: none"> • Understanding the basic principles of computer graphics. | | | |

Data completării

Semnătura titularului de curs

Semnătura titularului de seminar

Data avizării în catedră/departament

Semnătura șefului catedrei/departamentului