Master in de Ingenieurswetenschappen: Computerwetenschappen Profiel Multimedia
Master in Applied Sciences and Engineering: Computer Science Profile Multimedia
Examples of Courses
Image Processing (5 ECTS) - Prof. Adrian Munteanu

- Global Image Transforms
- Wavelet Transform
- Image enhancement and image restoration
- Image segmentation
- Mathematical Morphology
Computer Vision (4 ECTS) - Prof. Hichem Sahli

- Introduction & Review of Linear Algebra, Geometric
- Camera model - Image Formation
- Camera model - image geometry
- Camera model - image radiometry
- Epipolar Geometry & Stereo Reconstruction
- Structure from Motion & Optical Flow
- Structured light & Time of Flight
- Machine learning for Recognition & Classification
- Object detection/classification & tracking
Virtual Reality (5 ECTS) – Prof. Gauthier Lafruit
3D Graphics OpenGL pipeline & Shaders programming

- 3D content formats
- OpenGL rendering pipeline with some maths (projection, quaternions, etc)
- How do VR glasses work?
- Depth sensing
- Photogrammetry
- Raytracing & Radiosity

Virtual Reality Project
Roller coaster
INFO-H-502

Programmed with OpenGL & shaders (practical sessions), not with Unity or Unreal (we teach the core of any 3D, not specific software packages).
Virtual Reality (5 ECTS)
Depth Image-Based Rendering (MPEG-I)

Give the illusion of a 3D animation without the need of explicit 3D modeling of all objects

Wrong!
Right, i.e. the way we teach it (but not part of the project)

Final score of the course = \( \frac{2}{3} \times \max(\text{theory}, \text{project}) + \frac{1}{3} \times \min(\text{theory}, \text{project}) \)
Parallel Systems (6 ECTS) – Prof. Jan Lemeire

• **Context:** software acceleration by parallelization of algorithms.

• **Main goal:** learn to design efficient parallel solutions on modern parallel systems.
  - Master low-level (hardware and system) and high-level IT skills (software engineering)

• **Three main programming paradigms**
  - Message-passing (MPI) for distributed-memory parallel architectures (clusters).
  - Multi-threading for shared-memory architectures (multicores).
  - OpenCL for GPUs.

• **Prerequisites:** good programming skills, basic knowledge of computer systems

• **More information:** http://parallel.vub.ac.be -> teaching
Cryptography (3 ECTS) – Prof. Ann Dooms

- Building blocks of secret communication within historical/societal context:
  - Symmetric cryptosystems
  - Public-key cryptosystems
- Recapitulation of the underlying mathematical concepts from number theory (Euclidean and modular division, finite fields, ...)
- Applications
  - Hash functions, digital signatures and blockchain
  - Homomorphic encryption for privacy preservation
  - Watermarking for multimedia content
  - ...