System requirements for PC/MAC, for studies at the Game School

This is a checklist over the system requirements for students that would like to study BA in Animation & digital Arts, and BA in Game Techniques & Simulations. **

Please note! Students applying for the VR/AR Post-Graduate program will get specialized hardware provided by the school. Personal machines can be used for homework and may follow the recommendation provided below.

Please note! Students that are applying for the BA in Game Technology and Simulations could manage with computers which are slightly less powerful than the minimum requirements listed below, but because of the study program’s increasing focus on VR and AR development, it is also recommended that all students acquire VR-ready computers.

Students applying for the VR/AR yearly program that would like to get their own personal machine for homework use, should get a VR-Ready PC only.

**Note! This computer is your most important tool during your studies. If you save a few bucks now, it could cost you a lot of frustration later, when your computer is lagging behind and things doesn’t work the way you had liked & your time is limited - please keep that in mind.

Specifications (LAPTOPS):

- CPU: Intel i7 – minimum 4 core, 2.7GHz w/Turbo Boost to 3,4GHz or more

- RAM: 32GB – minimum 16 GB - 32GB is prefered, specially for those students planning to chose the Digital Arts track.

- GPU:
  - Nvidia GeForce GTX/RTX-card with minimum 4GB VRAM
  - Nvidia Quadro KxxxM, Mxxx & Pxxx w/ minimum 4 GB VRAM
  - If MacBook Pro – minimum AMD Radeon Pro-card, 2+ GB VRAM - * see text below on use of Macs in the program.

**Please Note:**
Graphic cards (GPU) from ATI/AMD has a history of artifacts and display errors in Autodesk Maya (3D application). The Game School primarily used Autodesk Maya for 3D. We do therefore do not recommend buying systems with ATI/AMD graphic cards installed. ATI/AMD has in general not as good support in Adobe Premiere Pro CC and Adobe After Effects CC also, even though the support for OpenGL is got a lot better over the last few years.
VR-Ready Graphic cards: NVIDIA GeForce GTX 1060-1080+Ti are recommended.

Laptops with integrated graphics, like Intel HD Graphics, will not work and should not be considered!

- **Disk:**
  - **Preferred:**
    - SSD system disk 512 GB (minimum 240 GB) + internal regular HDD with 7200 RPM @ minimum 1 TB
  - **Ok:**
    - SSD system disk w/ minimum 240 GB + external HDD 7200 RPM @ minimum 1TB, USB 3.0/USB-C/Thunderbolt
  - **Minimum:**
    - HDD 1 TB, 7200 RPM (5400 RPM is NOT fast enough)

Please note: Hybrid disks (SSHD) can also be used as long as the SSD-part of the disk is large enough. (The reason for why we recommend this much storage space, is because the software used in the program typically use as much as 120 GB alone. With additional private software choices and specially usage/project work files, the used amount could easily surepass 250 GB. Minimum recommended free disk space on system disk, at all times, is 30 GB for optimal performance).

- **Screen:** We recommend 17" with Full HD-resolution or more – 1920 x 1080+ (MacBook Pro, minimum 15")
- **Network card:** Gigabit Ethernet and WiFi
- **Connections:** 1 or more of the following: USB 3.0/USB-C, eSATA, Thunderbolt.
- **OS:** Windows 10 Home/Pro, 64-bit. Mac OS X 10.12+
- **Digital Drawing Tablet** (Wacom recommended) - size M or larger

**Use of Macs in the program:**
Most of the software used in the program is available for Mac. Only MacBook Pro is powerful enough to handle the workload given with 3D and Motion Graphics.

**NOTE!** No MacBooks are VR-Ready VR-Ready - if you would like to have a VR-Ready machine, you will have to get a PC or a Thunderbolt expansion chassis and a GPU-card for an eGPU solution for your MacBook (only for new MacBooks with Thunderbolt 3).

Even though MacBook Pro is able to handle the workload, there are some things that should be considered before buying a Mac to use in this program:
MacBook Pro is in Norway generally sold in two different configurations: Either with Iris Graphics or with Radeon Graphics. Iris is NOT powerful enough and should not be considered as a valid option. Radeon has enough power and specs, but does have a historical problem with Maya, as mentioned above.

With the version “El Capitan” of the OS X, a new render called “Metal” was introduced. Metal works pretty well with software from Adobe and others, but for now, not with Maya.

MacBook Pro generates a lot of heat when on 100% workload. This decreases the performance of the machine to a lot less than what you would think, compared to the system specifications. This is caused by the MacBook Pro’s slim design, which causes poor air flow (cooling).

For the same price, the graphics cards on the Macbook Pros are not as good as what you get to PCs.

There are few options to upgrade the hardware of a Mac and it is very expensive if you want to keep your warranty.

** All system requirements listed above are only a recommendation, based on previous year’s experiences. These are not requirements that has to be filled to attend the Game School’s programs, but please be noted that all students are responsible for checking that their hardware and software is up to date, and able to handle the workload given in the program at the given time.