

## UF|SOA Student Computing Requirement

All students must have serviceable computers and software for use in studio. While CIRCA is available to meet most computing needs, downtime or issues with software/licenses may restrict your capability to produce during peak production times. Having your own computer will allow you to be more flexible and fluid with your incorporation of digital media into the design workflow. Windows laptops are highly recommended, as most AEC (Architecture / Engineering / Construction) software is Windows only and do not have viable Mac counterparts. You will also need a webcam (usually built-in to the laptop) and a mouse (trackpads will not work for drafting/modeling programs).

## UF|SOA Minimum Hardware Specifications

### LAPTOPS [Updated for 2020 Q2]

Component/Subsystem	Lower Division	Upper Division & Grad
CPU [3.0 GHz or higher]	Intel Core i5, i7 U Series Ex: [i7-8550U] [i5-8250U]	Intel Core i7. i9 H,K Series Ex: [i7-8750H] [i9-9900K] [i9-9980HK]
Processor Cores	Quad Core (4 physical, 8 logical)	Hex/Octa Core (6-8 physical, 12-16 logical)
Graphics Card	Intel HD Graphics 520 or above (These are integrated graphics on the CPU die and share slower system RAM) Ex: [Intel UHD Graphics 620] [Intel Iris Plus Graphics]	Discrete graphics card with DirectX support, 3-6 GB of dedicated video ram Ex: [Nvidia Geforce GTX 1050] [Nvidia Geforce GTX 1660Ti] [Nvidia Geforce RTX 2070 Max-Q]
RAM	8GB	16GB or higher
Storage SSD: Solid State Drive HDD: Hard Disk Drive	256 GB SSD or 1TB HDD, 7200 rpm	256GB SSD + 1TB HDD or 500GB SSD + 2TB external storage
Screen Size / Resolution	13"-15" / 1920 x 1080 or higher	15" or larger / 1920 x 1080 Full HD or 4K [A 24-27" desktop monitor can be helpful]
Connectivity	Gigabit LAN, 802.11 b/g/n WiFi	Gigabit LAN, 802.11 b/g/n WiFi
Operating System	Windows 10 64 Bit	Windows 10 64 Bit
Budget (Q2 2020)	\$600 - \$900 USD	\$900 - \$1600 USD
Example Product Series (Q2 2020)	Dell Inspiron 15 5000 Asus VivoBook S15, Asus Zenbook 13 Acer Aspire 5 HP Pavilion x350 13" Lenovo Thinkbook 13s, Yoga C740	Dell G3/G5 Series, Dell XPS15 Asus ROG Zephyrus G14, ROG Strix GL531GT Acer Predator Helios 300 MSI - GS 65 Stealth Lenovo Legion Y740, Y720

### DESKTOPS [Updated for 2020 Q2]

Desktops follow the same rules as above, except the SSD+HDD combo is highly recommended due to affordability, as well as a more powerful discrete graphics card. Intel Core i7/i9 Series desktop CPUs with the H/K suffix are generally good performers (ex: i7-9700K, i7-9750H), or more lately the AMD Ryzen 7/9 series (ex: Ryzen 7 3700X, Ryzen 9 3950X). Graphics card and system memory suggestion are the same as above.

## Purchasing Notes [Updated for 2020 Q2]

### CPU Choice:

- Rendering performance depends on CPU clock speed (GHz) and number of cores (quad, hex). Generally the higher number of both means faster, although rendering is well optimized for multi-threading therefore more cores has a larger impact than clock speed.
- As part of Intel's intentionally confusing branding strategy, there are many low-medium cost laptops with ultra-low voltage mobility CPUs, designated with the "U" suffix (i5-5200U, i7-5500U). While generally great for battery life and portability, these CPUs can be underpowered for intensive tasks like rendering. I suggest finding a true quad-core CPU with 4 physical cores (8 logical with Hyperthreading), usually these will come with the H or K suffixes (i7-7700K).
- It is always good to check how many physical/logical cores a CPU has before you buy. Intel CPU details can be found online here: <http://www.intel.com/content/www/us/en/processor-comparison/compare-intel-processors.html?select=laptop>
- Recent (Q2 2020) AMD Ryzen desktop processors outperform their Intel counterparts while offering great value, in particular the Ryzen 9 3900X, Ryzen 7 3700X, Ryzen 5 3600X. For laptops, the Ryzen 9-4900HS is a great choice as its performance rivals desktop CPUs. Currently it is only offered in the Asus ROG Zephyrus G14 gaming laptop.

### Graphics Cards:

- Graphics cards impact the speed and smoothness of your 3D program display (ex: Rhino viewport refresh rate). Many current thin and light laptops come with integrated Intel HD Graphics, which is in the CPU but shares system memory (which is slower) for texture application. These are passable but will struggle with heavier and more complex models.
- Ideally you want a laptop with a discrete graphics card, like the Nvidia Geforce series that has dedicated memory. These will be much faster with better draw quality. Nvidia generally has better driver support and is more stable than the AMD Radeon series for our applications. Shoot for a Geforce GTX 1060 or higher.
- Some render engines have begun rolling out tech that uses graphics cards for rendering calculations (GPU rendering), which can be 10-20x faster than CPU rendering. These carry the RTX prefix and are currently rather expensive but can be very powerful in the right applications. Ex: RTX 2070. Real-time render engines such as Lumion will require a powerful discrete graphics card with more than 3gb of video memory.

### Storage: SSD vs. HDD

- The single component that can speed up the user experience greatly is the Solid State Drive (SSD). While much more expensive per GB than traditional mechanical platter-based Hard Disk Drives (HDD), they are much faster and much less prone to failure due to lack of moving parts.
- SSDs come in smaller capacities (240, 480, 960 GB) so the ideal situation is to install all your frequently used programs (Windows OS, applications) on the SSD for speed, and have a larger 1TB+ secondary HDD for storage of media and data that are accessed less frequently (project files, photos, music, etc...). This secondary drive can be in the laptop if it is large enough to have two drive bays, or simply a portable external USB 3.0 HDD.

### Mac Users

- **Macs are not recommended due to lack of software support, high price, and the need to dual-boot in order to access the necessary software.**
- The MacBook Air will be underpowered and is not suitable. The 13" MBP has much faster CPU choices, and Intel Iris/Iris Pro Graphics are decent performance wise. The best MBP choice is still an upgraded 15" MBP with discrete GPU but will cost close to \$3000.
- Many of the applications required in architecture school are Windows exclusive, therefore Mac users are required to dual-boot using Bootcamp and an installation of Windows 10. Bootcamp comes with Mac OS X, but you will need to purchase a Windows 10 license. At the very minimum 180 GB should be allocated for your Windows partition to install and run everything you need. Virtual machine solutions that run Windows under Mac OS X (**Parallels, VMware**) **DO NOT work for our purposes**. The programs we use are too computationally intensive to be run as virtual machine installations.

## UF | SOA Software Requirements

You will be required to purchase software and specific software will be listed on each course syllabus. Plan on budgeting \$300-\$500 per year for software. Most software will also be available at the CIRCA Architecture computer labs in ARC 116, 118, 120. (<https://labs.at.ufl.edu/computer-labs/architecture/>)

It is **highly recommended** that your operating system is Windows 10 64-bit. Architectural design programs often work with large datasets and benefit greatly from the memory overhead as well as stability that a 64-bit OS provides.

The following is a list of commonly used software and where/how to obtain them for installation on your own personal computers.

### Commonly used software:

**GatorCloud:** Microsoft OneDrive <https://it.ufl.edu/services/gatorcloud-onedrive-uf>

All UF students have access to 5TB of cloud storage via GatorCloud. This is the safest way to backup data/work.

**Microsoft Office Suite:** Word | PowerPoint <http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/>

UF's campus-wide licensing agreement for Microsoft Office 365 ProPlus Education program allows multiple full downloads to personal devices of Office 2013 Professional Plus, Office 2016 for Mac, and Office for iPad at no charge.

**Autodesk:** AutoCAD Architecture | Revit Architecture | Revit Structures | Green Building Studio

<http://www.autodesk.com/education/free-software/all>

**Adobe CC:** Photoshop | Illustrator | InDesign | Acrobat <https://www.adobe.com/creativecloud/buy/education.html>

Alternatively, students may consider using UF Apps ( <https://info.apps.ufl.edu/> ), which is a "streaming" option available for a variety of applications, listed on the UF Apps website. However, please note that this requires a fast internet connection to use reliably, and user customization preferences are not retained between sessions.

**SketchUp Studio:** <https://www.sketchup.com/plans-and-pricing#for-higher-education>

**McNeel Rhinoceros 6.0:** [https://www.rhino3d.com/sales/north-america/United\\_States](https://www.rhino3d.com/sales/north-america/United_States)

Academic License Windows Version \$195. Please note the **Mac version is not fully-featured and will not work for our purposes**. UF has a special licensing agreement with McNeel and Educational Licenses are offered at a discount rate of \$125 at the UF Bookstore.

**Chaos Group: V-Ray Next for Rhino** <https://www.chaosgroup.com/education/academic>

**Lumion 10.3** <https://lumion.com/educational-licenses.html>

Free for students with status verification. Note that Lumion will require a powerful graphics card in order to run.