LAPTOP RECOMMENDATIONS (updated December 2023)

WINDOWS vs MAC:
For architecture and landscape architecture, ALWAYS choose a Windows laptop. For graphic design and video editing, a MAC might be slightly better. However, architecture and landscape architecture require compatibility with programs that are not accessible for Mac, and the industry relies heavily on Windows. People who use Macs in landscape and architecture are either bosses (who don´t use the design software), or Apple fans who learn to cope with the issues because they don´t want to give up on the Apple ecosystem. If you are not technologically savvy, I'd suggest you stick to Windows, your journey will be smoother.

SCREEN SIZE:
You should be aiming for a 15-inch laptop. That will give you the right balance between power and size. You don't want a very small (13-inch) or thin laptop because they won't be as powerful. And you might not want a 17-inch laptop because despite the benefit of a larger screen, they are heavier. If you get a 15-inch laptop, you can still buy a monitor aside that you can plug at home. Many students do this! In general, it's important to test the weight and make sure you are comfortable with the size. You are going to be carrying your laptop everywhere. Take your backpack with you if you are going to BestBuy or Walmart to make sure it fits, and that you are ok with the weight.

SCREEN RESOLUTION:
If you have settled for the 15-inch laptop, next step is choosing the right resolution, which is essentially how small the pixels are, and therefore how many of them fit in your screen. The more the better, of course, until the price is a problem. The options will be FHD, QHD and UHD (4K).

In general, the smaller your screen is, the more resolution you might want to compensate. The larger your screen, you might not need that much resolution because the price will increase exponentially. Also a 4K screen requires more energy (and battery) to run. But don´t get me wrong, if you have the budget to afford a 4K 17-inch laptop, please go for it!

Ideally, for design:

- 13-inch laptop – QHD, UHD (4K)
- 15-inch laptop – FHD, QHD, UHD (4K)
- 17-inch laptop – FHD, QHD

The sweet spot would be a 15-inch laptop with an QHD screen. 15-inch with FHD won't be the end of the world if the rest of the specs are what you are looking for. Think that you can still buy an extra cheap monitor to compensate for the "lower" resolution. A 17-inch laptop with a FHD is not a bad choice either, especially because a 17-inch with QHD or 4K will be very pricey. Again, an alternative solution would be to buy an extra cheaper monitor to make up for smaller screens or lower resolutions.

GPU (GRAPHIC PROCESSING UNIT or GRAPHIC CARD)
For design professions that involve graphic rendering (architecture, landscape architecture, video and 3D animation, etc) this is the key element that will differentiate a good computer from a bad computer.

You need a laptop with a DISCRETE GPU, not an integrated one.

GPUs companies upgrade their products every 2-3 years, and it can be a bit confusing what to pick, especially when there are different models within each generation.

For instance, NVIDIA GPUs:

- 2018-2021: RTX 20xx generation (2050,2060, 2070, 2080, 2090)
- 2020-2023: RTX 30xx generation (3050,3060, 3070, 3080, 3090)
- 2023-now: RTX 40xx generation (4050,4060, 4070, 4080, 4090)

The higher the number within each generation (xx50, xx60, xx70, xx80, xx90), the more powerful the GPU is. These numbers refer to more graphic cores on the graphic card, and also more video memory (VRAM – not to confuse with RAM memory later on this list). So, a xx50 model might have around 4GB of VRAM and the higher xx90 model around 16-24GB.

This document is being updated for 2023-2024, so we are in a transition between the previous (30xx) and the new generation (40xx). The key question now is: Is the new generation always better than the previous one????
Well not always! Some guidelines below:

- First, comparing equivalent numbers is easy. For example: Any 4090 will be always better than any 3090, 4080 better than 3080, 4070 better than 3070, and so on.

- Second, 3090 will still be better than any 4050, 4060, 4070... Hard to tell if it's better than 4080 without checking the specs. But essentially, it all depends on the card video memory (VRAM). Note: don't confuse the GPU VRAM memory (discussed here), with the RAM memory of the computer. Totally different things.

- For example, if a 3090 has 24GB of memory, it will be better than a 4060 with 6GB, better than a 4070 with 8GB, better than a 4080 with 12-16GB. But not better than a 4090 with 24GB.

- Good news about all the above is that suppliers normally want to get rid of the old models. So you might find good, discounted models with the "old" 30xx series.

- In this case, aiming for 3070, 3080, 3090 is still good investment, even if they are an older generation. If you are going for xx50 or xx60 because of the price difference, I'd prefer to go for a minimum 4060 then.

- Nowadays, the minimum should be an NVIDIA RTX 30xx. The minimum would be the 3050, then 3060, 3070, 3080 and 3090 at the top.

To sum up, let me repeat it once more:
DON´T BUY A LAPTOP WITH AN INTEGRATED GPU, it´s not enough for this profession.
YOU NEED A LAPTOP WITH A DISCRETE GPU.

CPU (CENTRAL PROCESSING UNIT):
The CPU is the heart of the computer, very important. However, in order to support a powerful GPU, your CPU has to be really good by default. So, you don´t have to worry so much about this aspect. The CPU will be ok whatever laptop you choose that has the above specs. There are two options in the market, Intel or AMD (Ryzen chips). They have their pros and cons. Intel is slightly more powerful in general, AMD is more efficient, better for multitasking and consumes less energy (longer battery time). But again, at this level, you might not appreciate the differences in terms of performance.

RAM:
RAM memory is what allows your computer to jump seamlessly between programs (don't confuse it with the GPU VRAM). Your laptop will switch faster between tasks with a higher RAM memory. Following the specs above, your laptop will come most likely with a minimum of 16GB of RAM. That's the bare minimum nowadays. However, I recommend aiming for 32GB if you want your laptop to run more smoothly (especially when you are working with three design programs, Youtube and Spotify all at the same time) and last a couple years more.

STORAGE:
Storage is obviously related to the amount of memory is used to save and keep files locally in your laptop. This internal storage can me complemented by external drives or thumb-drives, but it's important to have a good and large-enough internal drive to be able to install programs and save files. Similar to nowadays smartphones, if your laptop starts running out of internal storage space, it will start to slow down and undergo a drop in performance.

The standard today for internal storage is an SSD card (Solid State Drive), versus the older Hard Drive standard. The former is faster, physically smaller (just a card), more reliable, more resistant, and more expensive (but getting cheaper and cheaper every day). Today, the bare minimum should be 512GB. But I recommend aiming for 1024GB (or 1TB, same thing). More expensive laptops will give you the ability to have two internal slots to plug two SSD cards, so that you can use one for installing programs and the other one for saving all your files. This way, if your computer crashes, your work will be safely saved in the second SSD. Again, going for two SSD is not possible for majority of laptops. You will be OK with one 1TB SSD, and then having a small external drive to backup your files every now and then.

RAM and STORAGE UPGRADABILITY:
The possibility to upgrade/replace both your RAM and SSD can extend the life of a laptop a couple of years. The more RAM the faster the laptop will be able to jump between programs and have several programs open at the same time. And software is occupying more and more space every day, so planning ahead helps.

This is something that will be available only for more expensive computers, and that's why I put this at the end of the list. Finding a computer with all the mentioned specs above won't be difficult for around USD 2000 or less.

Finding a computer with all the above specs and upgradable/replaceable RAM and SSD will probably take the price to USD 2500-3000. Read the detailed specs to know what you are getting.

- SSD:
  - Bare minimum = 512GB
  - Good/really good = one slot that can take 1TB-2TB cards
  - Extra good = two slots, one for 512GB-1TB, and a second for 512GB-1TB-2TB

- RAM:
  - Bare minimum = 16GB
  - Good/really good = soldered 32GB/64GB
  - Extra good = upgradeable (not soldered!) 32GB to be replaceable with 64GB

CONCLUSION:

- Avoid fancy touch-screen laptops, super thin tiny laptops, or laptop tablets (Microsoft Surface, HP Spectre, Lenovo Yoga). Although handy, they don't host a dedicated GPU, and the touch-screen will make the laptop more expensive. These models will struggle with heavy 3d software. If you want to take notes and do digital sketching, buy a tablet just for that (ipad or samsung galaxy). You need a good pro laptop for the heavy lifting.

- 15 inch screen, QHD (only go for 17-inch laptops if you feel you can carry those all day long. If you need more screen surface, I'd suggest you buy a second "cheap" monitor (around 100 USD), many students do that for working at home).

- non-soldered RAM. If soldered, aim for 32GB. If non-soldered, you could go for 16GB and buy extra later to get up to 32GB

- Either way, 16GB of RAM is the absolute minimum nowadays, 32GB will the minimum in 2-3 years. 16GB is starting to become not enough to handle all your programs (and music, and videos) opened at the same time.

- a discreet GPU (aka graphic card). Nowadays, minimum a NVDIA RTX 3050-3060.
  The new 40xx will be slightly better but obviously more expensive.

- absolute minimum storage 512GB SSD. Better if 1TB SSD, way better if 2TB SSD or two separate 1TB SSD

- the CPU (the Central Processor Unit) will be ok whatever laptop you choose that has the above specs. There are two options in the market, Intel or AMD (Ryzen chips). They have their pros and cons. Intel is more powerful in general, AMD is more efficient, balanced, and with better battery.

- Intel processor current generation is 13th (released in 2023). Although the 13^h generation is better than the 11th and 12th, you will find better offers of the latter because retailers are always trying to get rid of the previous generation. Intel processors come in three versions per generation, i5, i7, and i9. The higher, the better, the more expensive. I would aim for i7, and i9 if you have budget.

- AMD processor current/new generation is 7000. Although the 7000 generation is better than the 5000-6000, you will find better offers of the latter because retailers are always trying to get rid of the previous generation. AMD processors come in four versions per generation, 3, 5, 7, and 9. The higher, the better, the more expensive. I would aim for 5, 7 and 9 if you have budget. In general, AMD processors are cheaper than intel.

- See laptop options on the next and final chapter

THE USUAL SUSPECTS:
Prices will vary. Today (December 2023), Intel last CPU model is generation 13th, so most laptop manufacturers are trying to get rid of their 12th generation at lower prices. Honestly, you won't notice the difference. All these are really good options, but the vary in price. Regardless, you will have a laptop for the next 3-5 years, or longer.

Other suggestions:

- I would recommend not getting second-hand or open-box laptops, even if they are highly discounted. They probably have been returned for a reason, and you want to avoid headaches later on.

- Make sure you get a warranty, either from the manufacturer, from the retailer (like BestBuy), or both! Buying a laptop that you know you can return if something goes wrong is a huge relief.

- Buying a laptop is an investment for the next 3-5 years, minimum. Overall, a laptop is not a cheap piece of equipment, but it will be your most important tool. You will use it EVERY SINGLE DAY. Even if you end up getting a high-end one ($2500-$3000), do the math: $3000 / (365 days * 3 years) = $2.7 per day. Not too bad, right?

- Regardless, learn how to maintain your laptop properly so it can last longer. My main suggestion, get a small laptop stand to tilt or raise your laptop to facilitate ventilation. All these laptops are very powerful and will run hot if the back or bottom fans get blocked. Blocking the fans will increase the laptop temperature and lead to malfunction or something worse.

- If this guide is overwhelming to you, probably the best thing to do is going to BestBuy, show their GeekSquad these recommendations, and let them show you what they have available. But remember, better no second-hand or open-box laptops.

What are your options?

The models that are apt for architecture and landscape architecture are of two main types (and there are hybrids between the two):

- **GAMING LAPTOPS:** beefier, heavier, bigger, but generally more powerful, better ventilation, noisier, so-so battery, less premium materials (plastic), slightly cheaper for the power they offer

- **CONTENT CREATION LAPTOPS**: sleeker, lighter, more compact, easier to carry, slightly less powerful, quieter, better more-durable battery, more premium feeling (aluminum, carbon fiber), slightly more expensive

All specs being equal, the CONTENT CREATION LAPTOP will be always more expensive because of the materials and because they are packing all the power into a thinner body. In general, GAMING LAPTOPS give you more bang for your buck. Almost all brands offer these two options!

And remember, especially if you choose a CONTENT CREATION LAPTOP, make sure they have a <u>DISCRETE GPU!!!!!!</u>

And finally, in no order of preference:

- **LENOVO LEGION** (gaming, mid-end and high-end) - really good, fair price for the quality

- **LENOVO THINKPAD** (creation, mid-end and high-end)- really good, fair price for the quality

- **ASUS TUF** (gaming, mid-end)

- **ASUS ROG STRIX** (gaming, high-end) - really good, fair price for the quality

- **ASUS ZENBOOK** (creation, high-end) – slightly more expensive

- **MSI RAIDER** (gaming, high-end) - really good, fair price for the quality

- **MSI STEALTH** (creation, high-end) – slightly more expensive

- **HP VICTUS** (hybrid, mid-end and high-end) - really good, fair price for the quality, known for getting a bit hot

- **HP OMEN** (hybrid, mid-end and high-end) - really good, fair price for the quality, known for getting a bit hot

- **RAZER BLADE** (hybrid, super high-end) - really good, but very expensive

In general, DELL laptops are known for having a premium price that provides you with excellent technical/customer service (that's why institutions like universities sign contracts with them):

- **DELL G SERIES** (gaming, mid-end) – powerful but a bit plasticky

- **DELL ALIENWARE** (gaming, high-end) – powerful but known for getting a bit hot, and expensive

- **DELL LATITUDE** (creation, mid-end)

- **DELL XPS 15'** (creation, high-end) - really good, but expensive

- **DELL PRECISION** (hybrid, super high-end) - really good, but by far the most expensive option together with the Blade)