# Introduction

GIS 400 is a course designed to introduce you to object oriented programming (OOP). This is not the typical GIS course, but is more of an introduction to programming that is taught using the Python programming language. Unlike most other GIS courses, this class focuses on developing your skills outside of the ESRI ArcGIS Desktop environment. Most work will be done outside of GIS software.

As stated in the syllabus, the end result of this course is that you will understand the *basic* theory of object oriented programming, be **familiar** with Python, be **familiar** with GIS programming and the ESRI platform for it, and being able to communicate all of this knowledge to a potential employer or coworker in the future.

Personally, I would not recommend the optional textbook. One valuable skill to develop in programming is complex problem solving and having a book with examples and answers all right in front of you really doesn’t do you too many favors in the long run. On top of that, anything computer-related gets updated or replaced extremely frequently, so a textbook written in 2013 will already be pretty outdated as far as specifics. General ideas may be the same, but for a beginner, the nuanced differences between the lecture and lab material and the textbook can be quite confusing.

# What can I do to prepare myself?

Sometimes, the best way to learn how to swim is to just dive in and figure it out. You may need a teacher to show you the most refined, healthy, and efficient way to do it, but you will figure out how to doggy-paddle and stay above the water. Programming can be similar. You can’t just jump in and expect to figure out all the complexities and nuances, but you can probably figure out more than you think by downloading someone else’s code and running it and seeing what it does.

The best thing you can do in preparation is to just be familiar with working with files such as python codes. Watch a tutorial and follow along rather than reading a book. The experience of trial and error to get command prompt to load the python interpreter and run a print command will benefit you when you have to debug a code that doesn’t run correctly.

If you can make your way through the process of installing python on your own computer and especially running a small code, you will likely be able to follow along the rest of this document. If you didn’t do any of that, you may not be too familiar with some of the things discussed here. If that is the case, you should install python right now and play around with it a while. When you have a question, just google it and take the time to figure it out.

# Integrated Development Environments (IDE’s)

Now, Dr. Zhang will tell you to just use the python IDLE (and some tutorials you went through might have used it too), but I would recommend you try a more advanced development environment. The reasoning here is similar to a car. Let’s use the logic of you not needing all these extra features since you are a beginner to that of learning how to drive. In that logic, you should learn how to drive on a manual transmission and are expected to somehow learn at the same speed as a friend on an automatic. Not only do you have to learn how to drive on the road correctly, but also how to get the car going and when to shift gears and how to not stall, etc., etc. This isn’t to say that you can’t learn how to drive on a manual, but you can learn quicker and less stressfully on an automatic. After getting the basics of driving down on an automatic, you could definitely switch to a manual and be able to focus specifically on developing that specific area of knowledge.

This is my logic with IDE’s. Get an advanced IDE that is user-friendly that you like. Preferably, it should have auto-complete, color-coding, intelligent suggestions while coding, and debugging features such as specific error messages and feedback. This way you can catch mistakes faster and see what those mistakes are specifically rather than relying on your own knowledge to figure out why your 100+ lines of code are throwing an error *somewhere*.

I personally use JetBrains’ PyCharm (Community Edition). It is free for personal use and contains loads of beginner-friendly options as well as advanced features. This enables you to continue using the same IDE even when you become a proficient programmer. It is scalable to your experience level.

# The Class

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# Where to go for help

Google is your best friend. If you are getting confused and overwhelmed in lecture and/or lab, go run through a tutorial on YouTube or somewhere else that deals with whatever you are struggling with. This gives you the ability to hear different explanations and teaching styles and being able to go at your own pace.

Dr. Zhang wants to help you understand this stuff. He is seriously the most caring professor I have ever taken. Go to his office or have him come to your computer and get him to help you debug or ask him why something is happening.

# Last Things

I think the key here is to supplement your lectures with ***experience***. Without it, you will not go very far with programming, regardless of your grade in this class at the end. Pick a project that interests you and stick it out through the errors and the bugs and you will learn a ton.

I have in this repository a bunch or resources from examples to instructions to web page links to completed assignments/projects. Dr. Zhang does know about this repository, so don’t even try to copy anything from here to pass as your own. I have made sure to change certain lines to make them not work for the course assignments. The general structure and such will work, though and I believe that this repository will add some value to your experience in GIS 400.

-Joseph Gerland

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