

Advanced Application of Bioinformatics in Genetic Research.

This special topic course is designed for students who took GMS6014 and want more hands-on experience in applying bioinformatics and computational approaches to solve real research problems. Unlike GMS6014, knowledge of programming (i.e. a college-level course in basic programming concepts or previous experience in writing scripts) is required. In lieu of this requirement, a strong commitment to learning the programming language Python in parallel to this course must be demonstrated by communicating with the course director.

In addition to learning basic scripting skills using Python and/or R, students will take a bioinformatics project pertinent to their research work (or assigned by the instructor) and develop it over 10 weeks. Examples of suitable projects include, but are not limited to, analyzing high throughput sequence data sets, comparative analysis of sequences, automated data extraction and integration, modeling a biological process, etc. Class will meet at 10:30-11:45 on every Thursday during modules 1 & 2 of the Fall semester (August 24 -October 26). In person meeting will be in CGRC-291. Zoom is optional for the second half.

There will be two types of class meetings. The **lectures** will be given by the instructors on topics related to the interest of this group. The **discussion classes** will be mediated by the faculty to discuss the resources, strategy, planning, and development of the projects in a learn-from-peer environment.

The class is limited to a maximum of 7 students. A laptop computer with a wireless connection is required for participating in discussions and sharing information.

- Recommended reference book:

“**Bioinformatics Data Skills: Reproducible and Robust Research with Open Source Tools.**” by Vince Buffalo (2015, O’Reilly; [Amazon Link](#)) – *this book is more useful for those who already had some exposure with the Linux (Unix) system but want to be more efficient.*

- Course Directors:

Dr. Raad Gharaibeh (Raad.Gharaibeh@medicine.ufl.edu)

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Tentative schedule – based on the last time this course was offered. The actual schedule will be modified based on the projects involved.

Date	TOPIC		Instructors	Location
	Concept	Practice		
Aug. 24	Intro. How plan for a bioinformatics project.	Initiation of projects	LZ, RG	CGRC-291
Aug. 31	Intro to Python	Project Objectives and background	LZ, RG	CGRC-291
Sep.7	RNA-Seq analysis	DEG identification	RG, LZ	CGRC-291
Sept. 14	Intro to R	PCA, Volcano plot, Heat Maps for RNA-Seq.	RG, LZ	CGRC-291
Sept. 21	Project discussion		LZ ,RG	CGRC-291
Sept. 28	Functional analysis of RNA-Seq data	Pathway, GO, GSEA.	RG, LZ	CGRC-291
Oct. 5	Project discussion		RG, LZ	CGRC-291
Oct. 12	Cross genome comparison	Comparing expression profiles from different organisms.	LZ, RG	CGRC-291
Oct. 19	Trouble-shooting meeting		RG, LZ	CGRC-291
Oct. 26	Final progress report		LZ, RG	CGRC-291