课程大纲

COURSE SYLLABUS

1.	**课程代码/名称** **Course Code /Title**	BIO5012 生物信息学 Bioinformatics
2.	**课程性质** **Compulsory/Elective**	Elective (选修)
3.	**课程学分/学时** **Course Credits/Hours**	2/32
4.	**授课语言** **Teaching Language**	English
5.	**授课教师** **Instructor(s)**	Andrew Hutchins
6.	**先修要求** **Pre-requisites**	None

7. 教学目标 Course Objectives

Bioinformatics is a practical, hands-on approach to the field of computational biology. The course is recommended for biologists who are interested in getting a grounding in the application of computational techniques to biology.

This course will have a particular emphasis on next generation sequencing techniques, which are rapidly becoming all-pervasive in biological studies.

There will be practical assignments utilizing the tools described.

8. 教学方法 Teaching Methods

A combination of lectures and hands-on activities.

9. 教学内容 Course Contents

Section 1	Introduction, bioinformatics, systems biology, genomes, and the Human genome project
Section 2	Internet and online database resources (Assignment 1)
Section 3	Protein domains and nucleic acid sequence and sequence alignment, phylogeny and clustering (Assignment 2)
Section 4	Bioinformatics and the laboratory (Assignment 3)

	Section 5	Genomes, consortiums and sequence databases (Assignment 4)
	Section 6	Gene expression, Microarrays, RNA-seq, ChIP-seq, sequencing
	Section 7	GALAXY and IGV
	Section 8	Gene ontology and molecular pathways (DAVID, GREAT)
	Section 9	Regulatory genomics, transcription factors and motif discovery
	Section 10	The (Advanced) bioinformaticians toolkit
	Section 11	Network biology
	Section 12	Structural Biology
	Section 13	Computational modeling of biological phenomena
	Section 14	Presentation 1
	Section 15	Presentation 2
	Section 16	The dark matter of the genome, an appreciation for repetitive genomic elements
	Section 17	Evodevo genomics

10.	**课程考核 Course Assessment**
	Students are required to finish a final project along with coursework
11.	**教材及其它参考资料 Textbook and Supplementary Readings**
	• Agostino M, Practical Bioinformatics, Garland Science.