



GEACC

Projeto POSCOMP 2021

Responsáveis —



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Office Hrs: Mon & Wed 1-2p



MCZ Labs 105



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Informações —



Pré-requisitos: inglês e bom aproveitamento (por exemplo: mérito acadêmico ou índice de rendimento > 7) em lógica, cálculo (I, II e III), álgebra linear, matemática discreta, estrutura de dados, algoritmos de pesquisa e ordenação, e programação (Java, C/C++ ou Python).



A definir



A definir



A definir

Laboratório —

Monitores —

Sobre o GEACC

O Grupo de Estudos Avançados em Ciência da Computação (GEACC) é formado por alunos de Ciência da Computação (ou outra área relacionada) da FAESA Centro Universitário.

Objetivo

Estudar tópicos avançados em Ciência da Computação, principalmente relacionados a *matemática* (contínua, discreta e concreta), *algoritmos e estruturas de dados* (fundamentais e avançados) e *aplicações* (científicas, data science, machine learning e outras), com o objetivo específico de preparar os alunos participantes para alcançar nota ≥ 8.5 na prova POSCOMP de 2021 (o que corresponde a acertar pelo menos 60 das 70 questões da prova).

Material

Livros Obrigatórios

Cormen TH, Leiserson CE, Rivest RL, Stein C. *Introduction to Algorithms*. 3 ed. Cambridge, 2009 ("Alg1")

Recommended Text

Paxton, J.R. & Eschmeyer, W.N. *Encyclopedia of Fishes*. 2nd Edition. Harcourt Brace & Co. 1998.

Other

Any required journal articles and book chapters will be provided on Canvas.

Grading Scheme

15%	Review Paper
15%	Lab Worksheets
40%	Midterm Exams, 20% each
30%	Final Exam

Grades will follow the standard scale: A = 89.5-100; B = 79.5-89.4; C = 69.5-79.4; D = 60-69.4; F <60. Curving is at the discretion of the professor.

Review Paper

Students will choose a scientific article concerning a topic or species that we covered in class. For this assignment, you will write a summary of the paper and a review: strengths of the paper, things they could improve, perhaps any holes that they did not address, etc. You will then give your review to two classmates to independently review, and you will incorporate their edits into your final draft. You will turn in an abstract of the original paper, the two peer-reviewed copies of your review, the names of people whose papers you reviewed, and your final draft. 15% of your grade will depend on how thoughtfully and thoroughly you reviewed your peers' papers.

Learning Objectives

- Become familiar with the evolutionary history and taxonomic diversity of fishes
- Improve your understanding of the basic physiological and behavioral adaptations of fishes
- Gain skills regarding the dissection, collection, and preservation of fish specimens through laboratory work
- Learn to critically review a paper and summarize it, as well as review and provide helpful criticism to your peers' work

FAQs

? Para participar é preciso ter um alto Índice de Rendimento?

! Se você está se referindo ao Índice de Rendimento da FAESA, sim. Este programa de estudos é bem rigoroso e caso seu índice de rendimento esteja abaixo de 7, acreditamos que você terá muita dificuldade em manter os estudos em dia (lembre-se: você terá que estudar para a graduação E TAMBÉM para o grupo).

? O cronograma é fixo?

! A princípio sim, mas pode ser alterado a qualquer momento para melhor atender às necessidades dos participantes.

? Eu trabalho/estagio, posso participar?

! A princípio sim, desde que você tenha um bom Índice de Rendimento.

? Como o grupo funcionará?

! Boa pergunta! Ainda estamos definindo isso em maiores detalhes.

Make-up Policy

Make-up exams or assignments will only be allowed for students who have a substantiated excuse approved by the instructor *before the due date*. Leaving a phone message or sending an e-mail without confirmation is not acceptable. Labs are mandatory. Make-ups for missing a lab consists of a 1 paragraph summary of a recent fish-oriented journal article highlighted in the news AND a 4 minute power point presentation on the article to the class. Any additional missed labs will result in zero credit for that lab.

Diversity and Inclusivity Statement

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at 555-5555 or theiremail@email.com, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Academic Integrity

The University Code of Academic Integrity is central to the ideals of this course. Students are expected to be independently familiar with the Code and to recognize that their work in the course is to be their own original work that truthfully represents the time and effort applied. Violations of the Code are most serious and will be handled in a manner that fully represents the extent of the Code and that befits the seriousness of its violation.

MÓDULO 1: Base Matemática

Dez/2019	Functions and Models	<i>Calc</i> , capítulo 1.
	Recurrent Problems	<i>MatCon</i> , capítulo 1.
	What is a Proof?	<i>MatDis</i> , capítulo 1.
	The Well Ordering Principle	<i>MatDis</i> , capítulo 2.
	Systems of Linear Equations and Matrices	<i>AlgLin</i> , capítulo 1.
Jan/2020	Limits and Derivatives	<i>Calc</i> , capítulo 2.
	Sums	<i>MatCon</i> , capítulo 2.
	Logical Formulas	<i>MatDis</i> , capítulo 3.
	Mathematical Data Types	<i>MatDis</i> , capítulo 4.
	Determinants	<i>AlgLin</i> , capítulo 2.
Fev/2020	Differentiation Rules	<i>Calc</i> , capítulo 3.
	Integer Functions	<i>MatCon</i> , capítulo 3.
	Induction	<i>MatDis</i> , capítulo 5.
	Recursive Data Types	<i>MatDis</i> , capítulo 6.
	Euclidean Vectos Spaces	<i>AlgLin</i> , capítulo 3.
Mar/2020	Applications of Differentiation	<i>Calc</i> , capítulo 4.
	Number Theory	<i>MatCon</i> , capítulo 4.
	Infinite Sets	<i>MatDis</i> , capítulo 7.
	Number Theory	<i>MatDis</i> , capítulo 8.
	General Vector Spaces	<i>AlgLin</i> , capítulo 4.
Abr/2020	Integrals	<i>Calc</i> , capítulo 5.
	Binomial Coefficients	<i>MatCon</i> , capítulo 5.
	Directed Graphs & Partial Orders	<i>MatDis</i> , capítulo 9.
	Communication Networks	<i>MatDis</i> , capítulo 10.
	Eigenvalues and Eigenvectors	<i>AlgLin</i> , capítulo 5.
Mai/2020	Application of Integration	<i>Calc</i> , capítulo 6.
	Special Numbers	<i>MatCon</i> , capítulo 6.
	Simple Graphs	<i>MatDis</i> , capítulo 11.
	Planar Graphs	<i>MatDis</i> , capítulo 12.
	Inner Product Spaces	<i>AlgLin</i> , capítulo 6.

Jun/2020	Techniques of Integration	<i>Calc</i> , capítulo 7.
	Generating Functions	<i>MatCon</i> , capítulo 7.
	Sums and Asymptotics	<i>MatDis</i> , capítulo 13.
	Cardinality Rules	<i>MatDis</i> , capítulo 14.
	Diagonalization and Quadratic Forms	<i>AlgLin</i> , capítulo 7.
Jul/2020	Further Applications of Integration	<i>Calc</i> , capítulo 8.
	Discrete Probability	<i>MatCon</i> , capítulo 8.
	Generating Functions	<i>MatDis</i> , capítulo 15.
	Events and Probability Spaces	<i>MatDis</i> , capítulo 16.
	Linear Transformations	<i>AlgLin</i> , capítulo 8.
Ago/2020	Differential Equations	<i>Calc</i> , capítulo 9.
	Asymptotics	<i>MatCon</i> , capítulo 9.
	Conditional Probability	<i>MatDis</i> , capítulo 17.
	Random Variables	<i>MatDis</i> , capítulo 18.
	Numerical Methods	<i>AlgLin</i> , capítulo 9.
Set/2020	Parametric Equations and Polar Coordinates	<i>Calc</i> , capítulo 10.
	Deviation from the Mean	<i>MatDis</i> , capítulo 19.
	Random Walks	<i>MatDis</i> , capítulo 20.
	Recurrences	<i>MatDis</i> , capítulo 21.
	Applications of Linear Algebra	<i>AlgLin</i> , capítulo 10.
Out/2020	Infinite Sequences and Series	<i>Calc</i> , capítulo 11.
	Vectors and the Geometry of Space	<i>Calc</i> , capítulo 12.
	Vector Functions	<i>Calc</i> , capítulo 13.
	Partial Derivatives	<i>Calc</i> , capítulo 14.
	Multiple Integrals	<i>Calc</i> , capítulo 15.
Nov/2020	Vector Calculus	<i>Calc</i> , capítulo 16.
	Second-Order Differential Equations	<i>Calc</i> , capítulo 17.

MÓDULO 2: Algoritmos

Nov/2020	The Role of Algorithms in Computing	<i>Alg1</i> , capítulo 1.
	Basic Programming Model	<i>Alg2</i> , capítulo 1.1.
	Data Abstraction	<i>Alg2</i> , capítulo 1.2.
Dez/2020	Bags, Queues, and Stacks	<i>Alg2</i> , capítulo 1.3.

	Elementary Data Structures	<i>Alg1</i> , capítulo 10.
	Growth of Functions	<i>Alg1</i> , capítulo 3.
	Analysis of Algorithms	<i>Alg2</i> , capítulo 1.4.
Fev/2021	Case Study: Union-Find	<i>Alg2</i> , capítulo 1.5.
	Elementary Sorts	<i>Alg2</i> , capítulo 2.1.
	Getting Started	<i>Alg1</i> , capítulo 2.
	Mergesort	<i>Alg2</i> , capítulo 2.2.
	Divide-and-Conquer	<i>Alg1</i> , capítulo 4.
Mar/2021	Quicksort	<i>Alg1</i> , capítulo 7.
	Quicksort	<i>Alg2</i> , capítulo 2.3.
	Heapsort	<i>Alg1</i> , capítulo 6.
	Priority Queues	<i>Alg2</i> , capítulo 2.4.
	Applications	<i>Alg2</i> , capítulo 2.5.
Abr/2021	Sorting in Linear Time	<i>Alg1</i> , capítulo 8.
	Symbol Tables	<i>Alg2</i> , capítulo 3.1.
	Hash Tables	<i>Alg2</i> , capítulo 3.4.
	Hash Tables	<i>Alg1</i> , capítulo 11.
	Priority Queues	<i>Alg2</i> , capítulo 2.4.
	Applications	<i>Alg2</i> , capítulo 2.5.

MODULE 3: There Goes the Neighborhood

Week 14	Symbiotic Relationships	DOF Ch. 22, 492-497
	Behavior	DOF Ch. 23
Week 15	Ecology	DOF Ch. 25
	Conservation Efforts	DOF Ch. 26
Week 16	FINAL EXAM	Date & Time & Location

Lab Schedule

Week 2	Chondrichthyan Fishes	Students enjoy a two part lab: first, they examine specimens across the Chondrichthyan phylogeny; second, they dissect a small spiny dogfish shark.
Week 3	Harvard Natural History Museum	Students walk through the HMNH and the fossil collection, inspecting various fossil fishes.
Week 4	Basal Teleosts & Otocephalan Fishes	Students explore specimens across the basal Teleost phylogeny.
Week 5	Freshwater & Deep-Sea Fishes	Students explore specimens from a diverse group of fishes, and try to place each group in the broader phylogeny.
Week 6	Coral Reef & Pelagic Fishes	Students explore specimens from a diverse group of fishes, and try to place each group in the broader phylogeny.
Week 7	No Lab	
Week 8	Internal Systems	Students dissect fish specimens, probing and examining key internal systems.
Week 9	Jaw Dissections	Students again dissect their fish specimens, taking apart and visualizing the jaws of their fish.
Week 10	Sensory Systems & Buoyancy	Students again enjoy a two-part lab: first, examining a broad selection of specimens, comparing and contrasting sensory system apparatuses; and then conducting a series of small experiments to better understand the difficulties associated with buoyancy control in the water.
Week 11	Locomotion	Students dissect fish specimens, looking at muscular and structure of the body and fins. Students also participate in demonstrations designed to elucidate the concept of lift.
Week 12	Review Paper Projects	Students bring electronic devices and/or paper printouts of 2-3 paper choices, and will select peer reviewers. TAs will be available to assist students in choosing a paper and begin reviewing it.
Week 13	No Lab	
Week 14	No Lab	
Week 15	Final Exam Review Sessions	Review Paper Project Due