

# COURSE CALENDAR

## COMPUTATIONAL PHYSICS

FALL SEMESTER 2021

[https://www.phys.uconn.edu/~rozman/Courses/P2200\\_21F/](https://www.phys.uconn.edu/~rozman/Courses/P2200_21F/)



Last modified: December 8, 2021

MONDAY		WEDNESDAY	
Aug 30th	Lecture 1	Sep 1st	Lecture 2
Course logistics: Linux OS; Julia lang; git and GitLab;		Secure communications over insecure networks; asymmetric cryptography; ssh. Introduction to Julia programming. Homework 1 assigned: due 9/8/2021	
Sep 6th		Sep 8th	Lecture 3
Labor day – no classes		Basics of Command Line Interface. Julia programming, II	
Sep 13th	Lecture 4	Sep 15th	Lecture 5
Basics of Command Line Interface, II Working with Jupyter notebooks and Julia Julia programming, III		More of Command Line Working with Jupyter notebooks and Julia, II Julia programming, IV Homework 2 assigned: due 9/27/2021	
Sep 20th	Lecture 6	Sep 22nd	Lecture 7
More of Command Line Working with Jupyter notebooks and Julia, III Julia programming, V		Working with git repositories Computer representation of floating point numbers	
Sep 27th	Lecture 8	Sep 29th	Lecture 9
Working with git repositories, II Computer representation of floating point numbers, II Stability of algorithms		<b>Midterm I: take-home, due Oct 6, 2021</b> Stability of algorithms, II. Numerical integration. Benchmarking in julia.	

MONDAY	WEDNESDAY
<b>Oct 4th</b> <b>Lecture 10</b> Midpoint, trapezoid, and Simpson's formulas. Newton-Cotes quadrature.	<b>Oct 6th</b> <b>Lecture 11</b> Gaussian quadrature. QuadGK package. Ordinary differential equations, I. Euler's method. Homework 3 assigned: due 10/13/2021
<b>Oct 11th</b> <b>Lecture 12</b> Gaussian quadrature, II. QuadGK package. Ordinary differential equations, II.	<b>Oct 13th</b> <b>Lecture 13</b> Ordinary differential equations, III. Stability. Symplectic integrators. Homework 4 assigned: due 10/20/2021
<b>Oct 18th</b> <b>Lecture 14</b> Ordinary differential equations, IV. Stability. Symplectic integrators.	<b>Oct 20th</b> <b>Lecture 15</b> Julia package for IVP. Homework 5 assigned: due 10/27/2021
<b>Oct 25th</b> <b>Lecture 16</b> Spontaneous synchronization. Kuramoto model.	<b>Oct 27th</b> <b>Lecture 17</b> One, two, and three body problems Homework 6 assigned: due 11/3/2021
<b>Nov 1st</b> <b>Lecture 18</b> <b>Midterm II: take-home, due Nov 8, 2021</b> Restricted three body problem.	<b>Nov 3rd</b> <b>Lecture 19</b> <b>Guest lecture:</b> Prof. Cara Battersby, Introduction to Big Data
<b>Nov 8th</b> <b>Lecture 20</b> Restricted three body problem, II	<b>Nov 10th</b> <b>Lecture 21</b> White dwarfs Homework 7 assigned: due 11/17/2021
<b>Nov 15th</b> <b>Lecture 22</b> Monte Carlo methods.	<b>Nov 17th</b> <b>Lecture 23</b> Introduction to distributed computing.
<b>Nov 22nd</b> <b>Thanksgiving recess – No classes</b>	<b>Nov 24th</b> <b>Thanksgiving recess – No classes</b>
<b>Nov 29th</b> <b>Lecture 24</b> Image processing. Application: seam carving. Video: <a href="https://www.youtube.com/watch?v=rpB6zQNsQU">https://www.youtube.com/watch?v=rpB6zQNsQU</a>	<b>Dec 1st</b> <b>Lecture 25</b> Course review: distributed computing for Monte Carlo methods Homework 8 assigned: due 12/8/2021
<b>Dec 6th</b> <b>Lecture 26</b> Phase transitions. Ising model.	<b>Dec 8th</b> <b>Lecture 27</b> Ising model, II <b>Midterm III: take-home, due Dec 15, 2021</b>
<b>Dec 13th</b> <b>Week of Finals</b>	<b>Dec 15th</b> <b>Week of Finals</b>