MCHE 513: Intermediate Dynamics

Fall 2018

Dr. Joshua Vaughan

Rougeou 225

joshua.vaughan@louisiana.edu

@Doc_Vaughan

Course Info

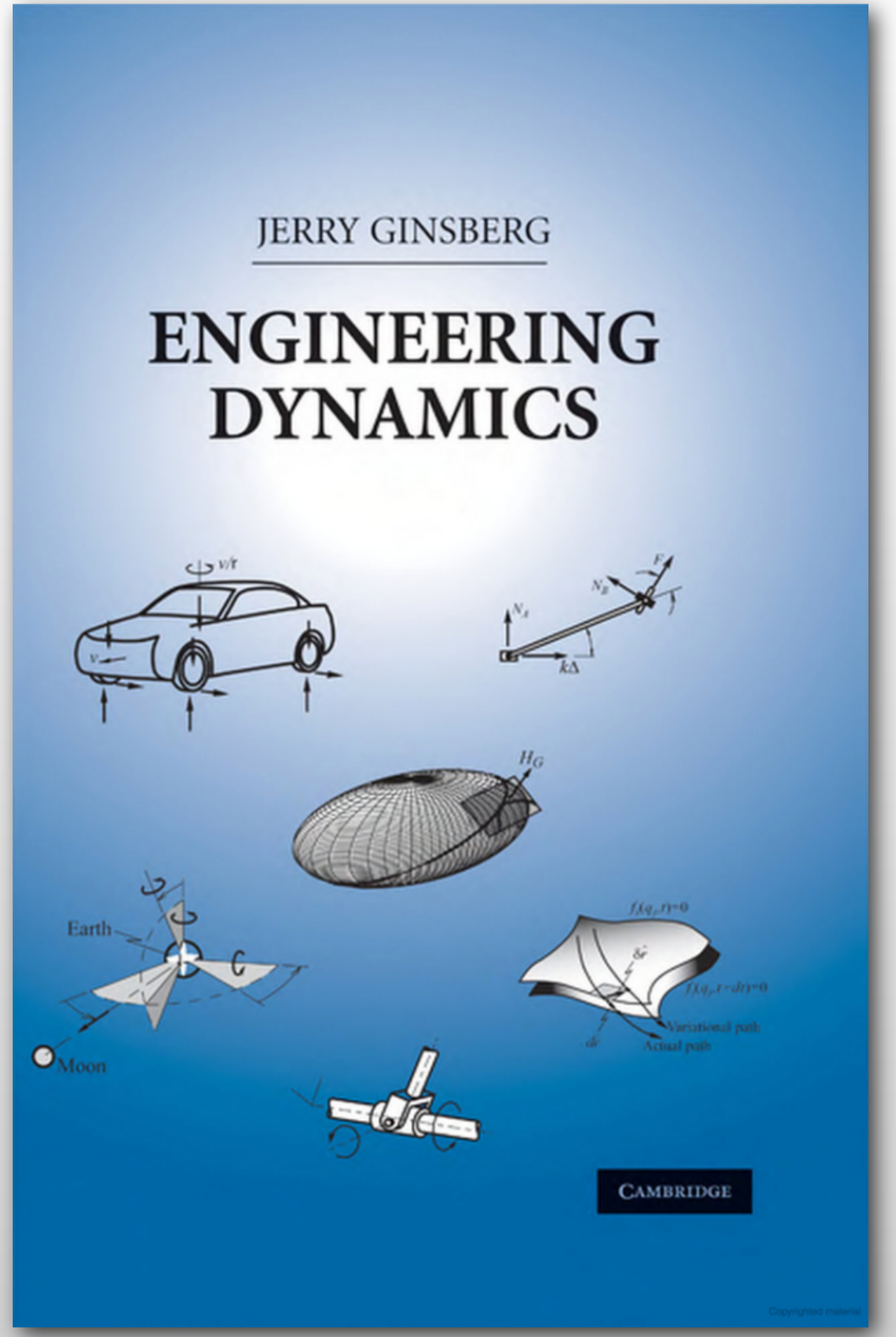
- Official Description:

  "*Three dimensional rigid body motion in non-inertial reference frames. Orbital mechanics, including stability. Energy methods applied to mechanical systems. Computer applications utilized as appropriate.*"

- Distill important dynamic properties for complex systems

Course Info (cont)

- TR 12:30 – 1:45pm, CLR 320
- Engineering Dynamics by Jerry Ginsberg
- http://www.ucs.louisiana.edu/~jev9637/MCHE513.html
- No set office hours (for now)



Material Covered

- Chapter 1 – Newton's Laws and notation
- Chapter 2 – Particle Kinematics
- Chapter 3 – Relative Motion
- Chapter 4 – Kinematics of Rigid Bodies
- Chapter 5 & 6 – Newtonian Kinetics
- Chapter 7 & 8 – Analytical Mechanics (Lagrange)
- Chapter 9 – Alternate formulations (Kane, etc.)

Schedule

	Tuesday		Thursday	
August	21	Course Introduction	23	Chapter 2
	28	Chapter 2	30	Chapter 2
September	4	Chapter 2	6	Chapter 3
	11	Chapter 3	13	Chapter 3
	18	Chapter 3	20	Chapter 4
	25	Chapter 4	27	Chapter 5

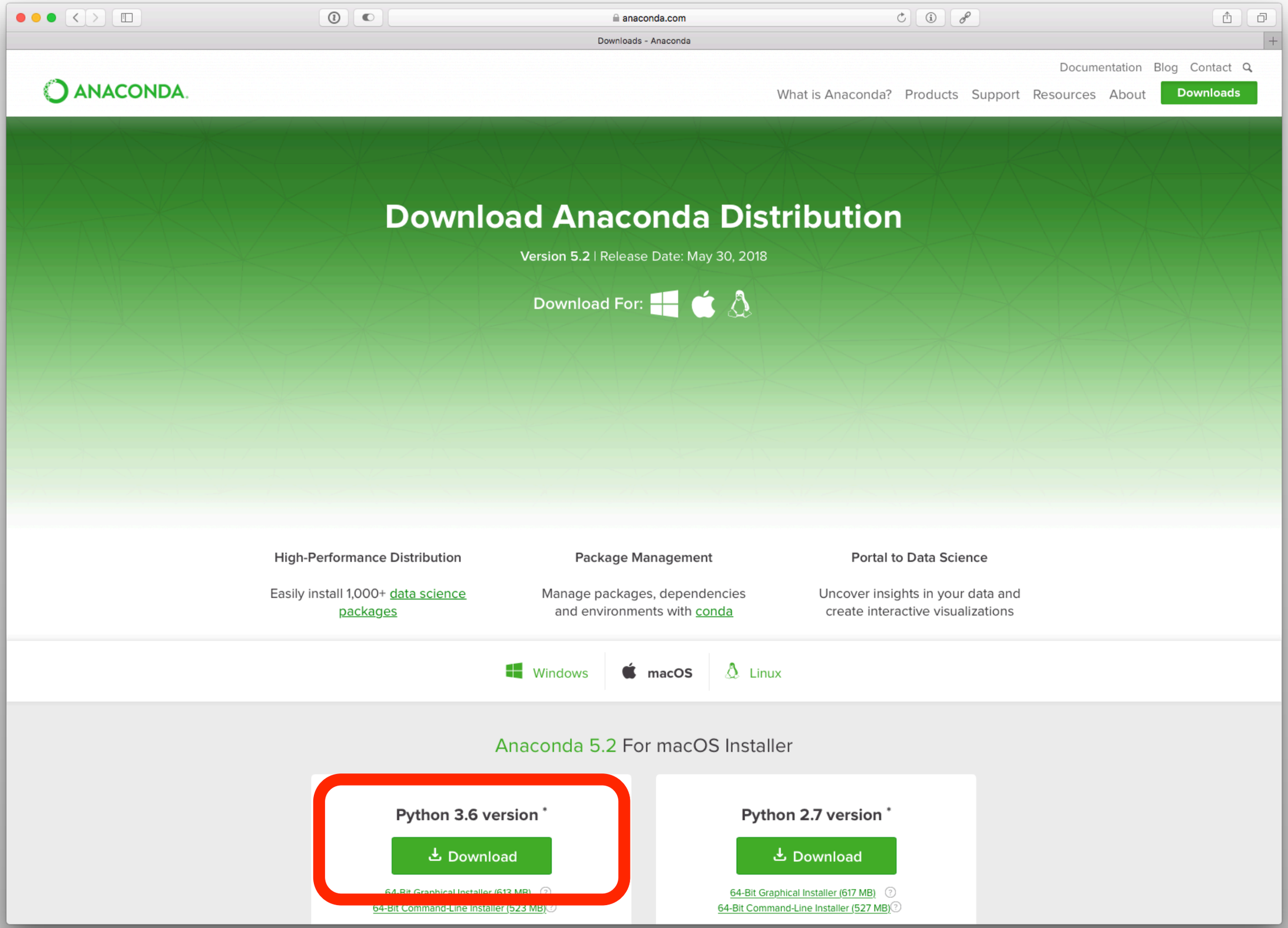
Schedule (cont)

	Tuesday		Thursday	
October	2	Chapter 5, Chapter 6 Intro	4	Fall Break
	9	**Mid-Term Exam 1**	11	Chapter 6
	16	Chapter 6	18	Chapter 6
	23	Chapter 6	25	Chapter 7
	30	Chapter 7		
November			1	Chapter 7
	6	Chapter 7	8	**Mid-Term Exam 2**
	13	Chapter 8	15	Chapter 8
	20	Chapter 9	22	Thanksgiving Break
	27	Chapter 9	29	Chapter 9
December				
	Final Exam – Thursday, Dec. 6, 8:00 – 10:30am			

Course Tools/Resources

- Simulation
  - Anaconda Python distribution – `http://anaconda.com`
    - ✦NumPy, SciPy, & Sympy
    - ✦Jupyter notebook - `https://jupyter.org`
    - ✦*Note:* Make sure to get the Python 3 version.

Python 3


anaconda.com
Downloads - Anaconda
Documentation Blog Contact
ANACONDA.
What is Anaconda? Products Support Resources About
Downloads
Download Anaconda Distribution
Version 5.2 | Release Date: May 30, 2018
Download For:
High-Performance Distribution
Easily install 1,000+ data science packages
Package Management
Manage packages, dependencies and environments with conda
Portal to Data Science
Uncover insights in your data and create interactive visualizations
Windows
macOS
Linux
Anaconda 5.2 For macOS Installer
Python 3.6 version *
Download
64-Bit Graphical Installer (613 MB)
64-Bit Command-Line Installer (523 MB)
Python 2.7 version *
Download
64-Bit Graphical Installer (617 MB)
64-Bit Command-Line Installer (527 MB)

Course Tools/Resources

- Simulation
  - Anaconda Python distribution – `http://anaconda.com`
    - ✦NumPy, SciPy, & Sympy
    - ✦Jupyter notebook - `https://jupyter.org`
    - ✦*Note:* Make sure to get the Python 3 version.
- GitHub repository – `https://github.com/DocVaughan/MCHE513---Intermediate-Dynamics`
- ***C.R.A.W.LAB*** Equipment

Grading

- Homework – 10%
  - Due approximately bi-weekly
  - Electronic submission (pdf via email)
  - Will include some simulation/coding
  - For you!
- Mid-Term Exams – 40%
  - 2 exams, equally weighted
- Mini-Projects – 20%
- Final Exam – 30%

General Rules/Advice

- Be responsible for your own learning
  - If you have a question, ask
  - Try to understand, not memorize

Dynamics-Specific Advice

- Work ***way*** more problems than you think you need to

- Remember that what we are modeling are physical systems. Relate the equations to how the system moves.

- Solve problems multiple ways, using:
  - Multiple methods (Newton, Lagrange, Kane, etc)
  - Different coordinate systems