Here is the syllabus for Physics 501: *Classical Mechanics*. At this stage, the details of the course content and order are probable rather than certain, as we may find ourselves wishing to adjust the focus as we proceed.

Here, too, is the grading policy for the course as well as the suite of Official Stony Brook University *Syllabus Statements*.

1. **Equations of motion in classical mechanics**
   - Action principles and Lagrangian mechanics
   - Constraints
   - Hamiltonian mechanics
   - Newtonian mechanics
2. **Conservations laws; symmetries as their origins**
   - Energy
   - Momentum
   - Angular momentum
   - Fields and Noether's theorem
3. **Integrating equations of motion**
   - Motion in one dimension
   - Motion in a central field
   - Keplerian motion
   - Motion of charged particles in electric and magnetic fields
4. **Collisions between particles**
   - Disintegration, collisions, and scattering
5. **Small oscillations**
   - Free and driven oscillations
   - Normal modes; the vibrations of molecules
   - Damped oscillations
   - Parametric resonance and nonlinear oscillations
   - The Stephenson-Kapitza pendulum
   - The ponderomotive force

6. **Motions of rigid bodies; accelerating frames of reference**
    - Angular velocity, the inertia tensor, and angular momentum
    - Equations of motion for rigid bodies
    - Euler's equations and spinning tops
    - Rigid bodies in contact
    - Extended Galilean transformations, the Coriolis force, and Foucault's pendulum
7. **The canonical equations**
    - Hamilton's equations
    - Poisson's brackets
    - Canonical transformations and canonical perturbation theory
    - The Hamilton-Jacobi equation and connections with wave mechanics
    - Action-angle variables and adiabatic invariants
    - Hannay's angle
    - Hamiltonian optics
8. **Basic ideas from the theory of continuous systems**
    - Strings, rods, and membranes
    - Elastic media, including superfluids, crystals, and liquid crystals
    - Fluids, waves in and on fluids, and fluid vorticity
    - Electromagnetic and other fields, Noether's theorem, and the canonical stress tensor
9. **Nonlinear dynamics and deterministic chaos**
    - Poincaré maps
    - The Kolmogorov-Arnold-Moser (or KAM) theorem

Grading Policy for the Course: In determining final grades, the weights given to the components of a student's work will approximately be: 65% for homework and 35% for the two examinations (taken together). Please note that these figures are liable to adjustment.

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Student Accessibility Support Center Statement: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at `sasc@stonybrook.edu`. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: `https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities` and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Professions, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at `http://www.stonybrook.edu/commcms/academic_integrity/index.html`

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the Health Sciences Center (HSC) Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.