



PH3101 Classical Mechanics

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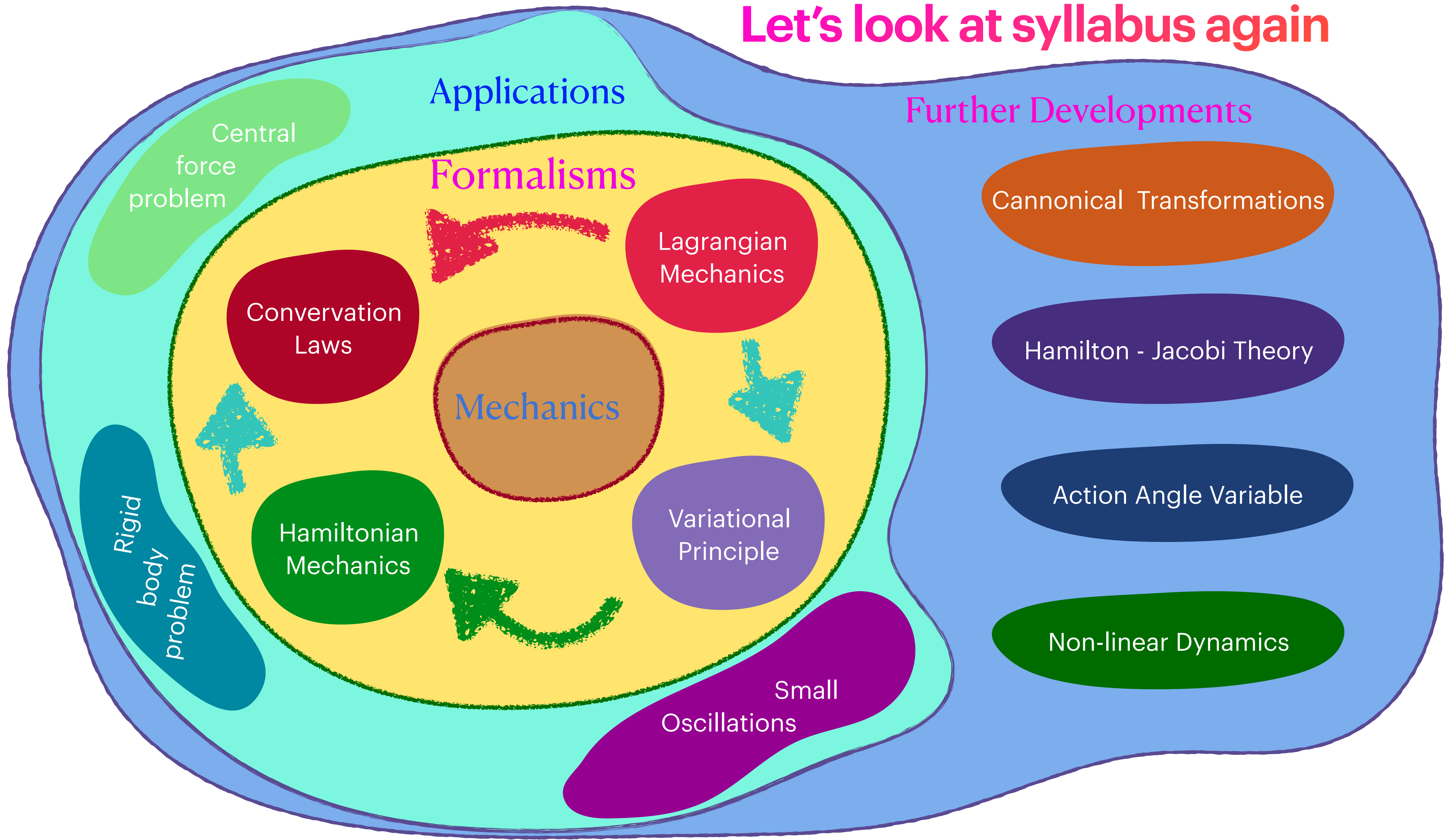
Let's look at syllabus

Link of Senate approved official syllabus!

<https://www.iiserkol.ac.in/teaching-plan/course/2024/Autumn/PH3101/>

- Free and constrained systems. Classification of constraints. Actual and virtual displacements. Ideal constraints. Principle of virtual work and D'Alemberts principle.
- Generalised coordinates. Generalised forces. Lagrange's equation for Potential forces. Applications to simple systems. Conservation laws.
- The Jacobi function and the Hamiltonian. Legendre transformations. Hamiltons canonical equations. Poisson brackets. The cotangent bundle. Canonical transformations. Liouville's theorem.
- The variational principle and Lagrange's equations.
- Rigid body dynamics. Euler angles. The Euler equations of motion. Torque free rigid body motion. The heavy symmetric top.
- Small oscillations. Normal modes and coordinates.
- Scattering by central forces. The differential cross section for Rutherford scattering.
- Dynamics of simple non-linear systems. Stability of autonomous and non-autonomous systems. Equilibrium, limit cycle, quasi-periodicity and chaos.

Let's look at syllabus again



(Un)official References!

'Classical Mechanics', Herbert Goldstein and John Safko Charles P. Poole, Pearson(2011).



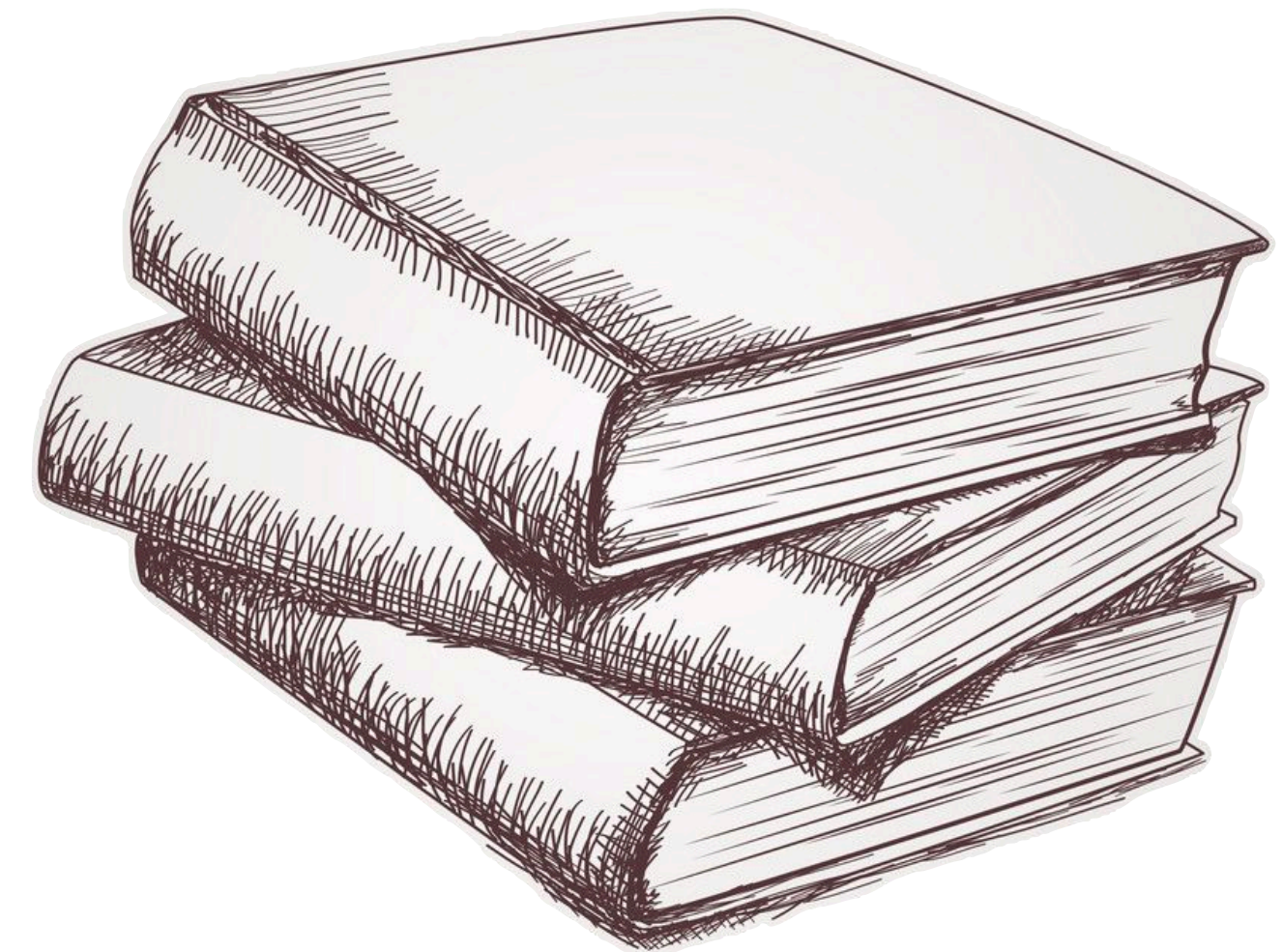
Classical Mechanics, by Narayan Rana and Pramod Joag.

Mechanics: Volume 1 (Course of Theoretical Physics S)
by L D Landau and E.M. Lifshitz

Classical Mechanics: Systems of Particles and Hamiltonian Dynamics by Walter Greiner (Author)

Lectures on Physics, Vol 1, Feynman, Leighton and Sands

- ★ F. Gantmacher, Lectures in Analytical Mechanics.
- ★ J. V. Jose and E.J. Saletan, Classical dynamics - a contemporary approach.
- ★ V.I. Arnold, Mathematical methods of classical mechanics.
- ★ Steven H. Strogatz, Nonlinear Dynamics And Chaos



Evaluation

Total numerical marks is in 100

➡ We take 2 best out of three class tests, It accounts to 20%	= 20
➡ One Mid-term exam with 10% contribution	10 x 1 = 10
➡ One Final exam with 40% contribution	40 x 1 = 40
➡ Homework and Tutorials with 30% contribution	30 x 1 = 30
	Total = 100
Number is converted to letter!	

Midterm and Final require a minimum of 50% attendance!
Your Midterm and Final marks will not be corrected!

Tutorials:

One hour Tutorial per week

you have an hour to solve a set of problems with help from each other and TA's. Paper should be turned in at the end of hour. These will be corrected by TA's. **There will be NO makeup tutorials!**

Class Test Dates

Class Test 1 - Monday, 2nd September, 5:00 to 6:00 PM

Class Test 2 - Monday, 28th October, 5:00 to 6:00 PM

Class Test 3 - Thursday 14th November, 1:00 to 2:00 PM

Make sure that you are available for these class tests, **there will not be any makeup tests!**

Assignments

Time to time (approximately once in two weeks) there will be assignment/homework. Each set will have two weeks time for submission. **Assignment will not be accepted after deadline.** Mode of submission will be announced as and when needed!

Use of digital Equipments In the Class

- ★ Use of Mobile phones are strictly not allowed during the class. **5% marks are deducted each time when a student is caught using mobile phone.**
- ★ Use of tablets for allowed for note taking with permission.
- ★ Use of Laptops/Desktops or other form of computing devices are not allowed in the class.
- ★ Any tools to access internet is not allowed during the class.

Teaching and Wellbeing

It is important to maintain good health.

The academic environment can be stressful, with both teachers and parents having high expectations.

Constant tests, tutorials, and homework can add to this stress.

From time to time, everyone faces health issues, both physical and mental.

It is crucial that we support each other during such difficult times. Please communicate if you have any difficulties, and help each other.

I am happy to be part of the class. It is possible that, knowingly or unknowingly, I will contribute to your stress level!

How to reduce Stress!

Honestly, I do not know. But we can try.

- Come to class regularly, socialize, and avoid isolating yourself.
- Spending too much time alone can be detrimental.
- Remember, teachers are there to help you, even if it may not always seem that way.
- Communicate your problems as much as possible to teachers, friends, and mentors.
- Walk around the campus, observe birds, chase dogs or foxes, look for snakes, count trees, etc.
- Read non-academic books, participate in social activities, and engage in various activities to maintain a balanced life.