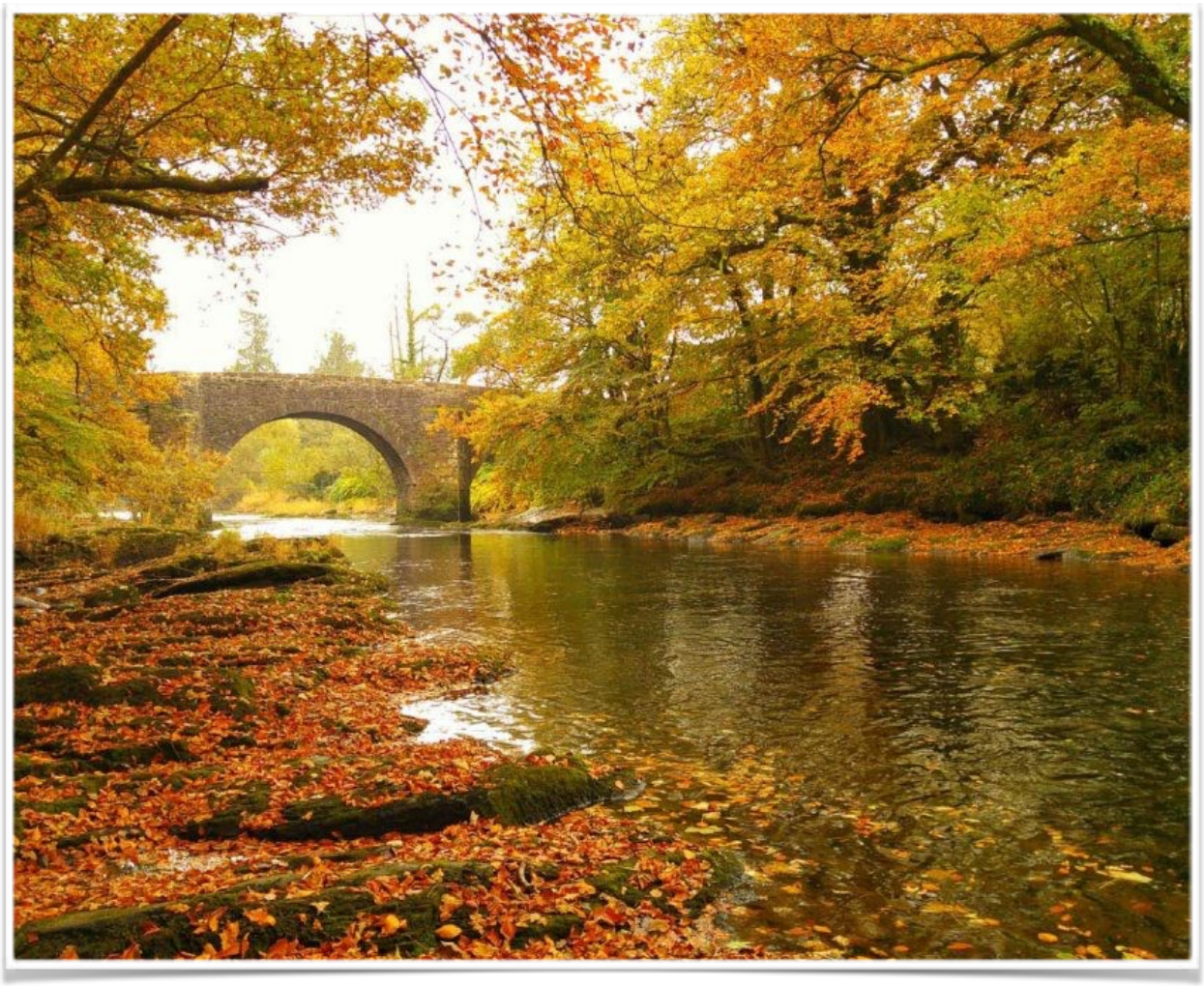
Theory of Continuous Media



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SYLLABUS (2H/WEEK)

1. Microscopic Theory of Continuous Media (TMC)

- Boltzmann-Vlasov-Klimontovich Rquations
- Momnets theory
- Stress tensor and its properties
- Conservation Laws and Constitutive Equations

2. Hydrodynamics

A. Ideal Liquids
   a. Euler Equations and Boundary Conditions
   b. Motion of Bodies in Liquid
   c. Variational principle for Euler Equations and Clebsh Potentials
   d. Canonical formulation of Euler Equations
   e. Van der Waalsa generalization of ideal liquids
   f. Viscous Liquids
   a. Navier—Stokes' Equations and Boundary Conditions
   b. Metriplectic formulation of the Naviert-Stokes Equations
   c. Hydrodynamical Fluctuations
   d. Comments on the Turbulence Theory

C. Non-Newtonian Liquids
D. Comments on Quantum Liquids
E. Examples and Applications

3. Elastic and Plastic Media

A. Elastic Media Equations of Motion

   a. Saint Venant Conditions

   e. Lame Equations and Stress Tensor for Media with different Symmetries t

   f. Examples and Applications

B. Nonidela Media

   a. Topological Defects

   g. Dislocations and Disclination

h. Microscopic Models: Frenkea—Kontorowa, Peierls

i. Geometrical theory of Dislocations and its generalization. Topological Defects Theory as Gauge Field Theory. Cosserat Media.

j. Viscoelastic Media

k. Maxwell Model and its Generalization

l. Crystallization

m. Examples and Applications

4. Plazma Theory

Requires more time to be included