2	Computational Physics by S. E. Koonin and D. C. Meredith, 1990. / Addison-Wesley	1990
3	An Introduction to Computational Physics by Tao Pang/Cambridge University Press	2010
4	Computational Physics by R. H. Landau and M. J. P. Mejia 1997. /John Wiley	1997
5	Computational Physics by J. M. Thijssen, / Cambridge Univ Press	1999
6	Computational Physics by K. H. Hoffmann and M. Schreiber /Springer	1996

1. Subject Code: **EP-413** Course Title: **Continuum Mechanics**
2. Contact Hours : L : 3 T : 1 P : 0
3. Examination Duration (Hrs.) : Theory : 3 Practical : 0
4. Relative Weight : CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0
5. Credits : 4
6. Semester : ODD
7. Subject Area : DEC- 5
8. Pre-requisite : Vector calculus , Elementary differential equations and elementary symbolic computing
9. Objective : * The continuum mechanics clearly brings out the general principles that are common to both solid and fluid mechanics. This subject also discusses necessity for assumption of solid and fluid i.e., in the form of constitutive equations. Further, the frame work of continuum mechanics is useful for understanding elasticity, plasticity, viscoelastcity and viscoplasticity.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Vector space, Cauchy-Schwartz inequality, and Triangle inequality, Dot product, Cross product, Outer product, Kronecker delta, Permutation symbol, Definition of tensor, Summation convention, Free index, Dummy index, Examples to understand notations, Operations on second-order tensors (SOT), Cofactor tensor, Invariants of SOT, Inverse of SOT, Eigenvalues and Eigenvectors, Geometric interpretation of eigenvectors, Cayley-Hamilton theorem	8
2.	Skew-symmetric, Orthogonal, and Symmetric tensors, Additive decomposition, Polar decomposition, Square root tensor, Calculus of Tensors	9
3.	Kinematics : Mapping function, Deformation gradient, Length, Area, and Volume, Material and spatial description, Rate of deformation, Spin tensors, Strain tensors, Rigid transformation, Leibniz rule of integration, Transport theorems	8
4.	Cauchy hypothesis and Cauchy theorem, Equation of motion, Angular momentum balance, Equation of motion in material coordinates, Piola Kirchhoff stress tensor, Energy balance, Second law of thermodynamics, Principle of material frame-indifference, Constitutive equations	8
5.	Linear elasticity: Applied Linear Elasticity: Mathematical solutions for plane stress, plane strain and axisymmetric boundary value problems, energy methods. Linear Viscoelasticity: Discrete models (Maxwell, Kelvin, Voigt), hereditary integrals, creep, stress relaxation, dynamic loading, hysteresis, Fluid mechanics: Introduction to Poroelasticity: Two-phase (fluid-solid) mixture models, balance laws for mass/momentum/energy, applications to biological tissues	9
	Total	**42**