

1.	Title of the course	Thermodynamics and Chemical Kinetics
2.	Course number	CY504L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CY5107/10
6.	To be offered by	Department of Chemistry
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	<p><b>Course Objective(s):</b> To impart knowledge on the underlying dynamics and energetics of many chemical processes. To introduce students with basic mechanism of the transformation of energy into different forms and its relation to physical observable such as temperature, pressure, and volume. To provide fundamental concepts about the rates and mechanisms of different chemical reactions.</p>	
10.	<p><b>Course Content:</b> Thermodynamics: laws, state and path functions and their applications, thermodynamic description of different processes, Maxwell's relations, spontaneity and equilibria, temperature and pressure dependence of thermodynamic quantities; Phase transitions, phase equilibria and phase rule; Thermodynamics of ideal and non-ideal gases, and solutions; Colligative properties; Partition functions and their relation to thermodynamic quantities; Introduction to Non-equilibrium thermodynamics; Chemical kinetics: empirical rate laws and temperature dependence, complex reactions, steady state approximation, determination of reaction mechanisms, collision and transition state theories, unimolecular reactions, enzyme kinetics, salt effects, homogeneous catalysis, photochemical reactions, diffusion controlled and electron transfer reactions.</p>	
11.	<p><b>Textbook(s):</b></p> <ol style="list-style-type: none"> <li>1. Atkins P and Paula J, <i>Physical Chemistry</i>, Oxford University Press (2010).</li> <li>2. Castellan G W, <i>Physical Chemistry</i>, Narosa (2004).</li> </ol>	
12.	<p><b>Reference(s):</b></p> <ol style="list-style-type: none"> <li>1. Berry R S, Rice S A and Ross J, <i>Physical Chemistry</i>, Oxford University Press (2000).</li> <li>2. Borgnakke C and Sonntag R E, <i>Fundamentals of Thermodynamics</i>, Wiley (2009).</li> <li>3. Callen H B, <i>Thermodynamics and An Introduction to Thermostatistics</i>, Wiley (2006).</li> <li>4. Laidler K J, <i>Chemical Kinetics</i>, Pearson Education India (2003).</li> </ol>	