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| 1.  | Title of the course  | Basics and Applications of Plasma Physics |
| 2.  | Course number  | PH605L                                    |
| 3.  | Structure of credits   | 3-0-0-3                                   |
| 4.  | Offered to   | PG  |
| 5.  | New course/modification to   | Modification To PH6021/8                  |
| 6.  | To be offered by   | Department of Physics                     |
| 7.  | To take effect from  | July 2022                                 |
| 8.  | Prerequisite   | Nil                                       |
| 9.  | <b>Course Objective(s):</b> The course is designed to introduce the basic concepts and application of low temperature plasmas. Introduction to basic electrical and optical diagnostic schemes will be covered. Plasma mediated processes employed in practical applications will also be outlined.  |   |
| 10. | <b>Course Content:</b> Definition of plasma, types of plasma, basic plasma parameters, Debye shielding, quasi neutrality, natural oscillation, basic characteristics of electric discharge, Paschen law, plasma generation; Electrical diagnostics: basic overview, current voltage characteristics, transition region, electron saturation current, floating potential, determination of plasma parameters using Langmuir probe; Optical diagnostics: basic overview, thermodynamic equilibrium, cross-section and reaction rates, simple non-equilibrium plasma kinetic models, estimation of plasma parameters using absolute and relative emission intensities, plasma based advance oxidation, plasma liquid interaction, application of non-thermal plasmas. |   |
| 11. | <b>Textbook(s):</b><br>1. Friedman A and Kennedy L A, <i>Plasma physics and engineering</i> , Taylor and Francis (2004).<br>2. Chen F F and Chang J P, <i>Lecture notes on principles of plasma processing</i> , Springer (2003).  |   |
| 12. | <b>Reference(s):</b><br>1. Du C M and Yan J H, <i>Plasma remediation technology for enviornmental protection</i> , Springer (2017).<br>2. Griem H R, <i>Principles of plasma spectroscopy</i> , Cambridge University Press (1997).<br>3. Lieberman M, <i>Principles of plasma discharges and material processing</i> , Wiley, New Jersey (2005).<br>4. Razier Y, <i>Gas discharge physics</i> , Springer-Verlag Berlin Heidelberg (1991).  |   |