

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI**  
**PROFORMA FOR NEW COURSE**

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| 1.  | Title of the Course   | Introduction to Polymer Science          |
| 2.  | Course Number   | CY5021                                   |
| 3.  | Status of the Course  | Elective                                 |
| 4.  | Structure of Credits  | 3-0-0-3                                  |
| 5.  | Offered To  | PG                                       |
| 6.  | New Course/Modification to  | New                                      |
| 7.  | To be Offered by  | Dr. Debasish Mondal and Dr. Rajib Biswas |
| 8.  | To take effect from   | January 2019                             |
| 9.  | Prerequisite  | Nil                                      |
| 10. | Whether approved by the Department  | Yes                                      |
| 11. | <b>Course Objective:</b> This course will provide the basics of both Physics and Chemistry of polymers to understand the underlying principles of it's structure and dynamics. The recent research developments will also be discussed.   |  |
| 12. | <b>Course Content:</b> Chemistry of polymers: Definition and classification, Vinyl polymers, Inorganic polymers, Condensation and radical polymerization, Copolymerization, Molecular weights, Rubber, Thermodynamics of polymer solutions.<br>Physics of Polymers: Random flight model, Gaussian chain, Excluded volume effect, Scaling behaviour, Rouse model, Zimm model, Dynamical scaling, Normal modes, Structure factor, Entanglement effect, Tube model, Reptation dynamics. Polymer translocation. |  |
| 13. | Text book(s):<br>1. M. Rubinstein, R. H. Colby, <i>Polymer Physics</i> , Oxford University Press, (2003).<br>2. A. Ravve, <i>Principles of Polymer Chemistry</i> , Springer, (2016).  |  |
| 14. | Reference(s):<br>1. M. Muthukumar, <i>Polymer Translocation</i> , CRC Press, (2011).<br>2. F. Flory, <i>Principles of Polymer Chemistry</i> , Cornell University Press, (1953).<br>3. M. Doi, S. F. Edwards, <i>The Theory of Polymer Dynamics</i> , Clarendon Press, (1988).   |  |