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

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| 1. | Title of the Course | Joining Technologies |
| 2. | Course Number | ME5103 |
| 3. | Status of the Course | Elective |
| 4. | Structure of Credits | 3-0-0-3 |
| 5. | Offered to | PG |
| 6. | New Course | Yes |
| 7. | To be offered by | Department of Mechanical Engineering |
| 8. | Faculty | Dr. Degala Venkata Kiran |
| 8. | To take effect from | January 2018 |
| 9. | Prerequisite | Manufacturing technology |
| 10. | Whether approved by the Program | Yes |
| 11. | Course Objective:<br>Aim of this subject is to develop in-depth understanding on joining techniques namely welding, brazing, soldering and adhesive bonding. The course deals in detail with fundamentals of the arc generation, various metal transfer phenomenon, critical reviews of important welding processes and the heat flow involved in the welding processes, and its subsequent effect on the weldment distortion and residual stresses. Furthermore, the principles and various technologies related to brazing, soldering and adhesive bonding will be explained in detail. | |
| 12. | Course Content:<br>**Welding** – welding and allied processes, physics of welding arc, various metal transfer phenomenon; critical review of fusion welding processes – SMAW, TIG, MIG and $CO_2$ welding, plasma arc, SAW, resistance welding; critical review of solid state welding processes – friction welding, friction stir welding, diffusion welding, ultra sonic welding; scope and application of electron beam and laser welding processes; heat and fluid flow in welding, residual stresses and its measurement, welding distortions and its prevention.<br>**Brazing and soldering** – basic principles, various technologies, brazing filler metals/solders and fluxes, design of brazed/soldered joints.<br>**Adhesive bonding** – basic principles, functions of adhesives, mechanism of adhesion, failure in adhesive bonded joints, joint design. | |
| 13. | Text Book:<br>1. Parmar R.S., Welding engineering and technology, 1st edition, Khanna publications (2004).<br>2. Parmar R.S., Welding processes and technology, 3rd edition, Khanna publications (2003). | |
| 14. | References:<br>1. Sindo Kou, Welding metallurgy, 2nd edition, John Wiley & Sons (2003).<br>2. Kalpakjian S., and Schmid S.R., Manufacturing Engineering and Technology, 6th edition, Pearson Education (2009).<br>3. O'Brien R.L., Welding processes, volume 2, eighth edition, Welding hand book (American Welding Society) (1995).<br>4. Koichi Masubuchi, Analysis of welded structures, 1st edition, Pergamon Press Ltd. (1980).<br>5. Robert W. Messler Jr., Principles of welding, 1st edition, John Wiley & Sons (1999).<br>6. Harry Udin, Welding for engineers, John Wiley & Sons (1954). | |