INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: **"C-C and C-O Bond Formation through Umpolung Reactivity of Imine and Synthesis of Amide and Lactam using Meldrum's Acid"**

Name of Thesis Supervisor(s) : Professor Chandan K Jana

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SHORT ABSTRACT

The contents of the thesis entitled "**C-C and C-O bond formation through umpolung reactivity of imine and synthesis of amide and lactam using Meldrum's acid**" have been divided into 8 chapters based on the results of experimental works performed during the complete course of the research period. C-C and C-O bonds are abundant in most organic molecules. Therefore development of new methods for C-O and C-C bond formations is an important aspect of organic synthesis. **Chapter 1** of the thesis presents a review on different aspects of umpolung reactivity of imine. **Chapters 2-4** describe the studies on C-O and C-C bond formation using umpolung reactivity of imine. **Chapter 2** describes a metal and oxidant free route to direct oxygenation of aldehyde to amide. In **Chapter 3**, metal free direct α-CH_2-oxygenation of free amines has been described. The method was found to be efficient for the synthesis of important drugs and their anlogs. Dehydrogenative direct C-C coupling of unprotected primary amines with active methylenes has been described in **Chapter 4**. In **Chapters 5-7** described the amides and lactams synthesis by using Meldrum's acid. Three component coupling of arylaldehyde, amines, and Meldrum's acid towards the synthesis of cinnamamides and piper amides has been described in **Chapter 5**. **Chapter 6** describes decarboxylative N-, O-, and S-

acetylation and acylation by using Meldrum's acid. Diasteroselective ene-lactam synthesis *via* one pot sequential reactions has been described in **Chapter 7**. Finally, **Chapter 8** contains the copies of ^{1}H and ^{13}C NMR spectra of selected new compounds.