Details of The Theses Offered by *Dr. Masud Hasan*

ID	1	**Thesis Topic**	Cache-Oblivious Data Structures and Algorithms
Description			*[Graph Theory course is not required for this topic.]* This is a very new topic of research in the field of algorithms and data structures. The memory architecture of modern computers uses a hierarchy of multiple levels of memory: cache 1, cache 2, RAM, and hard disk. The memory access time differs among different levels of memory, which is, however, often ignored by the traditional model of designing and analyzing algorithms. So the memory access pattern of an algorithm under traditional model significantly influences its practical running time. To overcome this problem, different more realistic models have been proposed and analyzed and so far cache-oblivious model is the most prominent one. In your thesis under this topic you will first learn about this model and about the algorithms and data structures that have been designed successfully under this model. Then you will try to find new useful algorithms and data structures under this model. [*In this topic, we will jointly work with the Cache-Oblivious group of Dr. M. Sohel Rahman*]
ID	2	**Thesis Topic**	Algorithms in Bioinformatics – I
Description			*[Earlier Biology knowledge and Graph Theory course are not required for this topic.]* These days many computer scientists are becoming more and more interested in bioinformatics research due to its huge global demand. Processing power of computers helps solving/discovering difficult and time consuming problems in biology, gene, DNA, RNA, evolution, etc. In spite of being a new research field, it is very vast and has sub fields including both theoretical and experimental research. For your thesis under this topic you will initially study different fields on bioinformatics research, in particular algorithms in bioinformatics. At the same time you will also find problems having scope for future work. Then you will work on one/two such problems and will try to find new results.
ID	3	**Thesis Topic**	Algorithms in Bioinformatics – II
Description			Description same as above. [*In this topic, we will jointly work with the Bioinformatics Algorithms group of Dr. M. Sohel Rahman*]

ID	4	**Thesis Topic**	3-Connected Planar Graphs
Description		Due to a surprising connection with 3 dimensional geometric objects, 3-connected planar graphs are an important graph class. In your thesis under this topic, you will first gather the known graph theoretic and geometric results for this graph class. Then you will try to find new results for this graph class.	
ID	5	**Thesis Topic**	Computational Geometry Algorithms
Description		*[Graph Theory course is not required for this topic.]* Computational geometry is a vast field of research. It involves efficient computation of geometric problems (in 2D, 3D, and higher dimensions). In your thesis under this topic you will first study some preliminaries on computational geometry from one/two text books. Then you will be given few research papers and/or small specific topics on computational geometry, possibly related to 3D. Then you will try to find new results in those topics.	