1.	Title of the course	Algorithmic Engineering
2.	Course number	CS504L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CS5022/6
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To bridge the gap between theory and practice in algorithms,by analyzing and implementing efficient libraries.	
10.	**Course Content:** The phases of algorithmic engineering life cycle such as design and analysis, implementation, experimentation and profiling, along with various machine models will be discussed, with the help of case studies. Algorithmic Tuning:propagation, preprocessing, memoization, filtering, pruning. Code Tuning: loop unrolling, data-access patterns, temporal locality, spatial locality. Route planning algorithms and speedup techniques: Bidirectional search, ALT, Hub-labeling, Transitnode routing, arc-flags, contraction hierarchy, customizable contraction hierarchy,phast, multi-criteria shortest path. Journey planning in pubic transportation: connection-scan-algorithm, raptor algorithm, guide-book routing, transfer patterns, scalable transfer patterns, multimodal journey, ride sharing, multi trip vehicle routing. Machine models: RAM, cache aware, cache oblivious, external memory,parallel computing.	
11.	**Textbook(s):** 1. Matthias Müller-Hannemann, and Stefan Schirra, *Algorithm Engineering: Bridging the Gap Between Algorithm Theory and Practice*, Springer (2010).	
12.	**Reference(s):** 1. Catherine C. McGeoch, *A Guide to Experimental Algorithmics*, Cambridge (2012).	