COURSE OUTLINE – subject to changes :

L-1	Mon 22 Aug	welcome to mcs 572 – supercomputing – measuring performance
L-2	Wed 24 Aug	scalability – types of parallel computing
L-3	Fri 26 Aug	high level parallel processing
L-4	Mon 29 Aug	basics of Message Passing (MPI) – broadcasting data
L-5	Wed 31 Aug	using MPI to write parallel programs
L-6	Fri 2 Sep	pleasingly parallel programs – Monte Carlo simulation
	Mon 5 Sep	**Labor Day holiday. No classes.**
L-7	Wed 7 Sep	static and dynamic task assignments – load balancing
L-8	Fri 9 Sep	partitioning and divide-and-conquer strategies
L-9	Mon 12 Sep	shared memory parallelism – an introduction to OpenMP
L-10	Wed 14 Sep	concurrent processes and threads – pthreads introduction
L-11	Fri 16 Sep	an introduction to the Intel Threading Building Blocks
L-12	Mon 19 Sep	parallel sorting algorithms – parallel quicksort
L-13	Wed 21 Sep	numerical integration on parallel computers
L-14	Fri 23 Sep	parallel fast Fourier transform – the isoefficiency function
L-15	Mon 26 Sep	pipelining to create parallel algorithms
L-16	Wed 28 Sep	applying pipelining to sorting
L-17	Fri 30 Sep	solving triangular linear systems with a pipeline
Project One due on Monday 3 October by 10AM		
L-18	Mon 3 Oct	synchronization with linear, tree, and butterfly barriers
L-19	Wed 5 Oct	parallel iterative methods to solve linear systems
L-20	Fri 7 Oct	heat distribution – domain decomposition methods
L-21	Mon 10 Oct	parallel Gaussian elimination
L-22	Wed 12 Oct	parallel numerical linear algebra
L-23	Fri 14 Oct	disk-based parallelism
L-24	Mon 17 Oct	big data and cloud computing
L-25	Wed 19 Oct	review of the first half of the course
L-26	Fri 21 Oct	**midterm exam (in class or take home)**
L-27	Mon 24 Oct	a massively parallel processor: the GPU
L-28	Wed 26 Oct	architecture of a modern GPU – programming models
Project Two due on Friday 28 October by 10AM		
L-29	Fri 28 Oct	programming GPUs with Python: PyOpenCL and PyCUDA
L-30	Mon 31 Oct	introduction to CUDA – writing massively parallel programs
L-31	Wed 2 Nov	data parallelism and matrix multiplication
L-32	Fri 4 Nov	device memories and matrix-matrix multiplication
L-33	Mon 7 Nov	thread organization and matrix multiplication
L-34	Wed 9 Nov	warps and reduction algorithms
L-35	Fri 11 Nov	memory coalescing techniques
L-36	Mon 14 Nov	performance considerations
L-37	Wed 16 Nov	quad double arithmetic on the GPU
L-38	Fri 18 Nov	case study: advanced MRI reconstruction
Project Three due on Friday 18 November by 10AM		
L-39	Mon 21 Nov	concurrent kernels and multiple GPUs
L-40	Wed 23 Nov	the Intel Xeon Phi coprocessor
	Fri 25 Nov	**Thanksgiving holiday. No classes.**
L-42	Mon 28 Nov	project presentations or review for final exam
L-43	Wed 30 Nov	project presentations or review for final exam
L-44	Fri 2 Dec	project presentations or review for final exam

Monday 5 December, 10:00AM-noon, final examination, room to be announced.