

CourseCS 6376.001, Parallel ProcessingProfessorRichard GoodrumTermSpring 2017MeetingsMW 8:30-9:45RoomECSN 2.110

Professor's Contact Information

Office Phone	972-883-8830		
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Office Location	ECSS 4.604		
Email Address	Richard.Goodrum@UTDallas.edu		
Office Hours	MW 10:00-10:45 or email for appointment		
Teaching Assistant	Ken Platz		
	The best way to communicate (other than during the office hours) is		
Other Information	through UTD email. Use email to set up appointments outside the office		
	hours.		

General Course Information

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Pre-requisites, Co- requisites, & other restrictions	CS 5343 "Algorithm Analysis and Data Structures" or equivalent.				
Course Description	This course introduces the concepts of high performance computing (HPC) through the application of OpenMP, OpenACC, and MPI. Students will use hundreds of processor cores and multiple graphics processing units (GPUs) to solve a variety of computational problems. Additionally, the course includes a brief introduction to quantum computing. The course will take the students through Amdahl's and Gustafson-Barsis' Laws, the Karp-Flatt and Isoefficiency Metrics. The topics include: Finite Difference Methods, Floyd's Algorithm, Matrix Multiplication, Solving Linear Systems, and Sorting.				
Learning Outcomes	 After successful completion of this course, the student should have an understanding of: a. Laws and metrics related to high performance computing b. High performance computing algorithms c. The use of multiple processor cores through OpenMP d. The use of GPUs for computational effectiveness via OpenACC e. The use of multiple computational nodes by means of MPI f. The basics of quantum computing 				
Required Texts & Materials	Parallel Programming in C with MPI and OpenMP 1st Edition by Michael Quinn Publisher: McGraw-Hill Science/Engineering/Math; 1 Language: English ISBN-10: 0072822562 ISBN-13: 978-0072822564				

	Parallel Programming with OpenACC		
	Edited by Rob Farber		
	Publisher: Morgan Kaufmann (2017)		
	ISBN: 978-0-12-4103397-9.		
Recommended			
Texts & Materials	Quantum Computing: A Gentle Introduction		
	by Eleanor G. Rieffel and Wolfgang H. Polak		
	Publisher: The MIT Press (March 4, 2011)		
	ISBN-10: 0262015064		
	ISBN-13: 978-0262015066		

Assignments & Academic Calendar

Week	Dates	Material Covered	Homework Due Monday	Program Due Wednesday	Project Milestones Due Sunday	Exams On Wednesday
1	9, 11 Jan				-	
2	18 Jan	OpenMP			Project Definition	
3	23, 25 Jan	l	1			
4	30 Jan, 1 Feb			1 OpenMP Only	Algorithm Outline	
5	6, 8 Feb	OpenACC	2			1
6	13, 15 Feb			2 OpenACC Only	Paper Outline	
7	20, 22 Feb		3			
8	27 Feb, 1 Mar			3 MPI, OpenMP, and OpenACC in combinations	Early Functional Code	
9	6, 8 Mar		4			
10	20, 22 Mar	MPI		4 MPI, OpenMP, and OpenACC in combinations	Paper Rough Draft	2
11	27, 29 Mar		5			
12	3, 5 Apr			5 MPI, OpenMP, and OpenACC in combinations	Final Code	
13	10, 12 Apr		6			
14	17, 19 Apr	Quantum Computing		6 MPI, OpenMP, and OpenACC in combinations	Final Paper	
15	24, 26 Apr	1	7			3
16	TBD				Project Presentation	

Important Dates and Times	First day of class: 9 Jan 2016 Exam 1: 08 Feb
	Exam 2: 22 Mar Exam 3: 26 Apr
	Term Paper: TBD

Course Policies				
	Exams: 30%, Programs: 50%, Optional Term Paper: 4%,			
Creding Critorio	Homework: 10%, Participation: 10%.			
Grading Criteria				
	To achieve a C or better, you must achieve am average of 60 or more on the exams.			
	Make-ups will be offered only if the student has a valid medical reason and			
Make-up Exams	produces a doctor's letter (in English) for the specific date. Blanket letters will not			
	be accepted.			
	The student with the highest computational performance on a programming			
Extra Credit	assignment will receive a 1% bonus to the final grade provided that the code is well			
LAtta Cicuit	documented and the program report is comprehensive.			
	The Term Paper is considered an optional assignment; hence, extra credit.			
	Programs and homework submitted after the due date will be penalized at the rate of			
Late Work	10% for every day by which it is late. Late submissions will not be accepted after			
	four days.			
Grade Disputes	Grade disputes must be made within two weeks of posting. After that, grades are			
F	final.			
	Regular attendance is recommended (see participation).			
	By departmental policy, three absences in a row will result in a full letter grade			
Class Attendance	reduction in the final grade. Four absences in a row will result in failing the class.			
	A student absent five or more classes not be eligible for an incomplete grade. In			
	such instances the student is advised to drop the course.			
	Participation is an in-class activity related to the discussions in which the student is			
Participation	involved. An anonymous student is one who does not participate. The participation			
~	grade is proportional to attendance.			
Classroom	The instructor encourages students to take active part in class discussions. No			
Citizenship	question is too simple/stupid to be asked. So, do not hesitate.			
	Students will:			
	a. De on unite to lectures.			
Instructor	D. Be allentive to fectures.			
Fynectations	d Perform their own work unless directed to participate in a group activity			
Expectations	e Avoid the use of any premade works of answers (the use of which			
	constitutes cheating)			
	f All student work done outside the classroom will be typewritten			
_	The information contained in the following link constitutes the University's policies			
UT Dallas	and procedures segment of the course syllabus.			
Syllabus Policies	r			
and Procedures	Please go to http://go.utdallas.edu/syllabus-policies for these policies.			

The syllabus is subject to change at the discretion of the Professor.