COMP90024 Cluster and Cloud Computing

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 3 hours per week Total Time Commitment: 200 hours
Prerequisites:	<table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>COMP90015 Distributed Systems</td><td>Semester 1, Semester 2</td><td>12.50</td></tr></table>
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Prof Richard Sinnott
Contact:	email: **rsinnott@unimelb.edu.au (mailto:rsinnott@unimelb.edu.au)**
Subject Overview:	**AIMS** The growing popularity of the Internet along with the availability of powerful computers and high-speed networks as low-cost commodity components are changing the way we do parallel and distributed computing (PDC). Cluster and Cloud Computing are two approaches for PDC. Clusters employ cost-effective commodity components for building powerful computers within local-area networks. Recently, "*cloud computing"* has emerged as the new paradigm for delivery of computing as services in a pay-as-you-go-model via the Internet. These approaches are used to tackle may research problems with particular focus on "big data" challenges that arise across a variety of domains. Some examples of scientific and industrial applications that use these computing platforms are: system simulations, weather forecasting, climate prediction, automobile modelling and design, high-energy physics, movie rendering, business intelligence, big data computing, and delivering various business and consumer applications on a pay-as-you-go basis. This subject will enable students to understand these technologies, their goals, characteristics, and limitations, and develop both middleware supporting them and scalable applications supported by these platforms. This subject is an elective subject in the Master of Information Technology and a mandatory for the Distributed Computing Specialisation. It can also be taken as an Advanced Elective subject in the Master of Engineering (Software). **INDICATIVE CONTENT**

	# Cluster computing: elements of parallel and distributed computing, cluster systems architecture, resource management and scheduling, single system image, parallel programming paradigms, cluster programming with MPI # Utility computing: foundations and grid computing technologies # Cloud computing: cloud platforms, Virtualization, Cloud Application Programming Models (Task, Thread, and MapReduce), Cloud applications, and future directions in utility and cloud computing # "Big data" processing and analytics in distributed environments.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** On completion of this subject the student is expected to: 1 Be able to understand emerging distributed technologies 2 Be able to design large-scale distributed systems 3 Be able to implement high-performance cluster and cloud applications
Assessment:	Individual Cluster Computing Assignment, requiring approximately 25 - 30 hours programming and 2000 word report (10%) Group-based Cloud programming assignment system, requiring approximately 50-55 hours programming and 5000 word report (40%) A 2 hour end-of-semester written examination (50%). Hurdle requirement: To pass the subject students must obtain at least: 25/50 in assignment/project work And 25/50 in the end-of-semester written examination. Intended Learning Outcome (ILO) 1 is addressed in all assessment components. ILO 2 is addressed in the project work, ILO 3 in the first assignment.
Prescribed Texts:	None
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subjects students should have the following skills: # Have improved skills in teamwork and presentation of results # Be able to undertake problem identification, formulation and solution # Have a capacity for independent critical thought, rational inquiry and self-directed learning # Have a profound respect for truth and intellectual integrity, and for the ethics of scholarship.
Notes:	**LEARNING AND TEACHING METHODS** The subject will be delivered through a combination of lectures and both individual and team-based learning. In team-based learning, a group of students will jointly develop applications. **INDICATIVE KEY LEARNING RESOURCES** Students will have access to lecture notes and lecture slides. The subject LMS site also contains links to recommended literature and current survey papers of cluster and cloud computing principles. **CAREERS / INDUSTRY LINKS** Adoption of the technologies taught in this subject, and in particular cloud computing, is growing quickly. All the big players in the ICT market offer at least one product that is based on these technologies. Therefore, there are many opportunities for professionals that understand them and are able to develop applications and support software for them. Some examples of commercial companies playing a major role in Cloud computing area are: Amazon, IBM, Microsoft, Google, Oracle, CA, VMWare, and Citrix. The area of "Big data" is also one of the "hot topics" in great demand in the industry at present.
Related Course(s):	Master of Information Technology Master of Information Technology Master of Philosophy - Engineering Master of Science (Computer Science)

	Master of Software Systems Engineering Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	Computer Science Computer Science MIT Distributed Computing Specialisation Master of Engineering (Software)