

MASTER OF ENGINEERING IN DISTRIBUTED COMPUTING

1. Background

The new full-fee coursework Master of Engineering in Distributed Computing (MEDC) degree is designed for graduates in engineering and physical sciences including those majored in computer science and software engineering, seeking technical and professional specialization in distributed computing, and also for professionals with background in related disciplines and working in the Information and Communication Technology (ICT) industry as software developers. The course design also has the provision to allow exceptional graduates in computer science and engineering to acquire research training to proceed to higher degrees by research. There will be provision for part-time study. It is intended to provide scheduling of subjects so it can be completed full-time in two calendar years. The course will have intakes in March and July each year.

The demand for courses in advanced ICT has rapidly expanded in recent years as business and society are being transformed by the emergence of Internet and Web as ubiquitous media for enabling knowledge-based global economy. This in turn has created a huge demand for Internet-enabled distributed computing technologies—such as Web and Grid services—and their applications that virtualise geographically-distributed resources to enable the creation of virtual enterprises, marketplaces, and service-oriented computing industries. The new degree has been designed to meet these skill-set requirements.

This degree, to be delivered by the Faculty of Engineering, is designed for graduates in computer science, computer engineering, combined electrical/electronic and computer engineering seeking technical and professional specialization in Internet-based distributed computing, and also for professionals with background in related disciplines and working in the ICT industry as software developers.

The degree is complementary to existing masters' level offerings in the IT area – the Master of Software Systems Engineering (MSSE) and the Master of Information Technology (MIT) – as it addresses demand from the emerging networked-IT market and emphasis on the use of industry standard technologies in the design and development of distributed systems and its applications. The MSSE takes four year graduates with prior knowledge of computer science and produces technically sophisticated software engineering graduates after 100 points of advanced level study. The MIT is a 150 point degree targeted at non-computer science engineering graduates to develop skills in IT area.

The Master of Engineering in Distributed Computing admits three or four year degree graduates in physical science or engineering including computer science and produces technically sophisticated graduates in Internet-based distributed computing after either 200, 150 or 100 points of study. Candidates holding a four degree (or three year degree with documented relevant work experience) in computer science or related discipline) would normally be offered the 100 point masters.

The suite of programs including the ones named above will assist the University to meet the needs of a cohort of graduates seeking advanced studies in the field of information and communication technology with specialization in Internet and distributed computing. To date the University of Melbourne has attracted a modest number of students in this market, because of non-existence of programs focused on this emerging area with huge requirements of skilled personnel. A significant element of the business case of the new degree programs, and critical to the overall push for market share in this area, is a fully coordinated Faculty-wide marketing activity. It also involves NICTA (National ICT Australia) due to our active involvement in its Victoria Laboratories with focus towards R&D in next generation Internet technologies and sensor networks.

The proposal has been analysed for its suitability and demand by examination of recent trends in coursework developments at competing institutions both nationally and internationally, notably Monash University the University of New South Wales, Vrije University (Amsterdam), University of Amsterdam, Trinity College Dublin (Ireland), ETH Zürich (Switzerland), Oxford University (UK), De Montfort University (UK), and Colorado State University (USA). In fact, the proposed degree is the first of its kind fully specialized on the emerging Internet-based distributed computing discipline through out the Asia-Pacific region.

2. Entry Requirements

200 Points (Entry Level 1):

- 3 year undergraduate degree in Science or Engineering, including mathematics and least one programming subject with a final year grade average of at least 65% and two years of relevant, documented work experience; or,
- 4 year degree in Science or Engineering, including mathematics and least one programming subject with a final year grade average of at least 65%.

150 Points (Entry Level 2):

- a 3 year undergraduate degree in Computer Science, Computer Engineering, Software Engineering, Information Technology or related discipline with a final year average grade of at least 65% and at least two years of relevant documented work experience; or
- a 4 year undergraduate degree in Computer Science, Computer Engineering, Software Engineering, Information Technology or related discipline with a final year average grade of at least 65%;

100 Points (Entry Level 3):

- a 3 year undergraduate degree in Computer Science, Computer Engineering, Software Engineering, Information Technology or related discipline with a final year average grade of at least 65% and studies in parallel and distributed computing related subjects at an advanced level and two years of relevant, documented work experience; or
- a 4 year undergraduate degree in Computer Science, Computer Engineering, Software Engineering, Information Technology or related discipline with a final year average grade of at least 65% and studies in parallel and distributed computing related subjects at an advanced undergraduate level.

English language requirements:

TOEFL (577 + TWE 4.5)

IELTS (6.5 Written 6.0)

Students with less than 6.5 IELTS may gain admission with 6.0 and are required to undertake and pass an English language subject as additional subject to the degree.

3. Course/Program Structure

The Master of Engineering in Distributed Computing has three streams with entry to those streams in accordance with the above selection principles.

The structure of each stream is as set out in the table below:

Entry Level	No. of Subjects to be Studied			Total Points
	Group A	Group B	Group C	
1	4	10	1	200
2	0	10	1	150
3	0	6	1	100

(Note: Subjects in Group A and B are 12.5 points and C is 25 points).

Group A (12.5 points subjects)	Comments
433-520 Programming and Software Development (<i>sem 1, 2</i>)	
433-521 Algorithms and Complexity (<i>sem 1, 2</i>)	
433-522 Internet Technologies (<i>sem 1, 2</i>)	
433-351 Database Systems (<i>sem 2</i>)	
433-352 Operating Systems (<i>sem 2</i>)	
433-481 Agent Programming Languages (<i>sem 1</i>)	
Group B (12.5 points subjects)	
Sub Group B1 - Compulsory	
* 433-6x1 Distributed Systems: Principles & Paradigms (<i>sem 1, 2</i>)	Compulsory
Sub Group B2 - Recommended	
433-678 Cluster and Grid Computing (<i>sem 1</i>)	Recommended
433-620 Engineering for Internet Applications (<i>sem 2</i>)	Recommended
* 433-6x2 Distributed Algorithms (<i>sem 1</i>)	Recommended
* 433-6x3 Mobile Computing Systems Programming (<i>sem 2</i>)	Recommended
433-677 Concurrency and Parallel Processing (<i>sem 2</i>)	Recommended
* 433-6x4 Sensor Networks & Applications (<i>sem 1</i>)	Recommended
Sub Group B3	
433-645 Software System Security (<i>sem 1</i>)	
433-675 High-Performance Database Systems (<i>sem 1</i>)	
433-621 Web Technologies, Protocols and Architectures (<i>sem 1</i>)	
433-641 Systems Requirements Engineering (<i>sem 1</i>)	
433-643 IT Project Management (<i>sem 1</i>)	
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433-680 Machine Learning (<i>sem 2</i>)	
Group C (25 points subject)	
* 433-6x5 Distributed Computing Project (<i>sem 1, 2</i>)	Compulsory

- 6xx - Denotes a new subject

- Alternatives to some of the 500 level subjects are 433-3xx and 4xx subjects with an additional assessment – the additional work that is required to bring the program up to the post graduate level. A maximum of two undergraduate subjects may be taken.

The first subject group (Group A), foundation studies, consists of subjects that bring students up-to-date with advanced computer science concepts, techniques and tools.

The second subject group (Group B) offers advanced study in distributed computing technologies and its applications and includes a number of new and existing subjects. MEDC students should study at least 4 “*Recommended*” subjects (Subgroup B2 subjects) in addition to the “*Compulsory*” subject (4336x1 – Distributed Systems: Principles and Paradigms from Subgroup B1).

Students in the 100 point stream are not required to study compulsory subject (433-6x1 – Distributed Systems: Principles and Paradigms from Subgroup B1) due to their prior knowledge in this subject. However they still need to complete 100 points of study.

The third subject group (Group C) offers an opportunity for students to carry out a solid practice-oriented or research-oriented project in distributed computing. Selection of projects will be on an individual or team basis, depending on the student(s) background and availability of supervision.

Subject descriptions for the proposed new subjects are provided below. Subjects will typically be taught with a combination of academic and practitioners input. Students are expected to have their own PCs/laptops to complete the course. They also need access to the University computing laboratories that support the design and development of distributed systems and applications.

With permission from the program director, where appropriate, subjects in Group A and B may be substituted by other suitable subjects.

4. EFTSL and Budgetary Consequences

There is no expected transfer of EFTSL's between faculties. The course is designed to attract to the University a new cohort of students.