

# PROPOSAL TO INTRODUCE A NEW COURSE

## 1. COURSE DETAILS

**1.1 Course ID** COMP9335

**1.2 Course name - Long**  
Wireless Mesh and Sensor Networks

**1.3 Course name - Abbreviated**  
Wireless Mesh and Sensor Networks

**1.4 Course Authority** Chun Tung Chou **ext/email** 57203/ctchou@cse.unsw.edu.au

**1.5 Organisational Unit responsible for course**

**School:** School of Computer Science and Engineering  
**Faculty:** Engineering

Academic Group Code (Faculty): ENG

Academic Organisation Code (Owner): COMPSC

### 1.6 Justification of Proposal

Wireless mesh and sensor networks are two emerging types of wireless networks which already have, and will continue to have, significant impact on realising new wireless services. For example, wireless mesh networking is an enabling technology to provide wireless access in rural Australia. It is also the technology behind providing city-wide WiFi access to many cities in the world. As another example, sensor networking is considered to be a technology enabler for pervasive computing and will have far-reaching impact on the lives of many people.

The aim of this proposed course is to introduce the students to key aspects in designing both wireless mesh and sensor networks. The topics covered include the routing, transport layer design, application and security in these types of networks. These topics are currently not covered by any networking courses within the School of Computer Science and Engineering as well as the School of Electrical Engineering and Telecommunications.

Many business analysts predict that the wireless mesh and sensor areas will be the high growth area in wireless technologies in the coming years. It is therefore important for us to educate our graduates in these two areas. The proposer together with other members of the CSE Network Research Lab hold a number of research grants in the wireless mesh and sensor areas. This course will expose the students to cutting edge research and training on wireless networking. It will therefore provide the necessary training for our graduates to work on these high growth wireless areas.

### 1.7 Consultation Process

Consultation within CSE – the staff to be consulted include academics in the network teaching clusters (Jha, Hassan, Kanhere); N. Parameswaran who has proposed a course on Wireless Programming for Mobile Enterprise Applications; Xuemin Lin who has research interests in data processing for sensor networks; as well as Achim Hoffmann, Associate Head of CSE.

**1.8 Units of credit (UOC) Session/s offered Hours Per Week**

6 UOC

First to be offered in 2007 in Session 1.

**1.9 Pre-requisites: COMP3331/9331**

**Co-requisites:**

**Exclusions:**

**1.10 Proposed Entry in the Faculty Handbook (including course description)**

UC6

Pre-requisites: COMP3331/9331

Wireless mesh networks (WMNs) and wireless sensor networks (WSNs) are two emerging wireless technologies which will have important impact in the future. In fact, the significance of WSNs has led to it being labelled as one of the most 21 technologies in the 21<sup>st</sup> century.

This course will cover the fundamental design principles behind building scalable WMNs and WSNs. The following aspects on wireless mesh and sensor networks will be covered: medium access control protocol, routing protocol design, transport layer issues, middleware, application and security. It will also cover case studies on deploying wireless mesh and sensor networks.

This course includes a laboratory components and minor design projects. It may also include guest lectures from leading industrial and academic researchers.

**1.11 Is this course replacing an existing course?**

YES

Give previous course ID and name

NO

x

**1.12 Undergraduate / Postgraduate / Other (delete what is not applicable)**

**1.13 Elective**

**1.14 Program stage**

Stage 4. Session 1, 2007.

**1.15 Program/s in which course is be available**

BE (CE 3645; SE 3648; Biolnf 3647), BSc (CS 3978), plus combined degrees involving any of these, and the following postgraduate programs: MEngSc 8685; McompSc 8680; MInfSc 8508; MSc 2665; ME 2765; PhD 1650;

**1.16 Proposed teaching methods and assessment practices**

Teaching methods: Lecture, laboratory exercises and mini-projects.

Assessments include mid-session, laboratories, mini-projects and end-of-session exam.

### 1.17 Assessment grades to be used

Full range of grades ie. HD, DN, CR, PS, FL

### 1.18 Mode of delivery

Internal X

External

Other (specify)

#### 1.18.1 Multi-mode Delivery Guidelines

The following issues should be addressed in proposals for Multi-mode delivery:

- parity in admission requirements to ensure that the integrity of programs at UNSW was not compromised;
- administrative processes relating to enrolments and dealing with students overseas;
- content and standard of courses and assuring comparability with on-campus courses;
- by whom and how courses were to be delivered;
- assessment procedures; and
- availability of library resources.

**Note:** The business components of off-shore proposals are considered by the International Strategies Committee (ISC) chaired by the Deputy Vice-Chancellor (Research) whilst the Academic Board approves the academic aspects of proposals for offshore delivery of existing programs. The ISC considers (i) partnership arrangements; (ii) whether the impact on the faculty of staff going overseas has been considered; and (iii) whether appropriate steps have been taken to register the program in the country concerned.

**The Postgraduate Coursework Committee has wished to ensure that the following issues have been addressed in proposals for offshore delivery:** parity in admission requirements to ensure that the integrity of programs at UNSW is not compromised; administrative processes relating to enrolments and dealing with students overseas; content and standard of courses and assuring comparability with on-campus courses; by whom and how courses are to be delivered; assessment procedures and availability of library resources.

Proponents should contact the Office of the Deputy Vice-Chancellor (Research) regarding this committee.

### 1.19 Information Technology Requirements for students

Standard resources available in the school

### 1.20 Textbooks

There is no recommended text for this course. The following is a list of reference books for the course:

1. C. Siva Ram Murthy and B.S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols, Prentice Hall.
2. Bhaskar Krishnamachari, Networking Wireless Sensors, Cambridge University Press
3. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley
4. Feng Zhao and Leonidas Guibas, *Wireless Sensor Networks: An Information Processing Approach*. Morgan Kaufmann
5. Jochen Schiller, Mobile Communications (2<sup>nd</sup> ed), Addison Wesley

### 1.21 Industrial experience component

NIL

## 2. RESOURCE STATEMENT

### 2.1 Enrolments

Estimated or proposed enrolments for the next three years.

2006:

2007: 30

2008: 30

(Note: The size of the class will be limited by laboratory facilities.)

### 2.2 Resource Requirements

#### Staffing Requirements:

Hours per week

3 Full-time Academic Staff

Part-time Teaching Staff

General Staff

#### Field Costs:

**Studio/Laboratory Requirements:** Laboratory requirement at 2 hours/week/student.

#### Materials Requirements:

#### Equipment Costs:

Each student will be issued with 2 wireless sensor devices (specifically moteiv from [www.moteiv.com](http://www.moteiv.com)) for the laboratory experiment. Each device costs A\$110 and with 30 students, the equipment cost is \$6600.

Note: We intend to seek industrial sponsorship on the equipment.

#### Computing Requirements:

Standard workstations fitted with Linux OS are required.

Only open source programs will be used for laboratory experiments.

#### Library Requirements:

Up to \$1200 for purchasing reference books for the course. (See

Section 1.20 for a list of recommended reference books.)

**Capital Funds Requirements:** No.

**2.3 Servicing Implications:**  
No.

**2.4 Teaching Arrangements:**

(i) Will other units contribute on a regular basis to the teaching of this course?

YES

NO           x

(ii) If so, which units are involved and what proportion of the course will they teach?

**2.5 Alternative Delivery Arrangements:**

**Not applicable.**

**2.6 Details of Tuition Fees:**

Proposed fee: Standard fee for an engineering course

\$       for non-award enrolment (local)

\$       for non-award enrolment (international)

\$       for course which forms part of full fee-paying program (for local students)

\$       for course which forms part of full fee-paying program (for international students)

### 3. AUTHORISATION

#### 3.1 University Librarian's Endorsement

**Note:** *this section of the Proposal must be signed by a Library representative, stating:*

I have examined the Library needs related to the above proposal and certify that existing Library holdings, staffing, services and accommodation are adequate / inadequate (delete one) to cover the demands that are inherent in it.

Appropriate arrangements for the use of digitised material to support this course have been made by the Course Authority with the University Librarian.

Further Comments:

University Librarian  
/ /2005

#### 3.2 Head of School's Approval

**Note:** *this section of the Proposal must be signed by the Head of School, stating:*

I have examined the resource implications of the above proposal in regard to staff, space, materials, equipment, capital funds, and computing, and certify that the School can cover the demands that are inherent in it.

Further Comments:

Head of School  
/ /2005

#### 3.3 Dean's Approval

**Note:** *this section of the Proposal must be signed by the Dean, stating:*

I have examined the resource implications of the above proposal in regard to staff, space, materials, equipment, capital funds, and computing, and certify that:

*(Tick whichever is applicable)*

- 3.3.1 (i) the proposal involves no additional resources. (A statement from the Head of School explaining how this can be achieved must be provided); or
- (ii) the proposal involves additional resources and it is proposed to redeploy existing resources within the faculty. (A statement from the Head of School explaining how

this will be achieved must be provided); or

- (iii) the proposal involves additional resources to be obtained as set out below; or
- (iv) the additional resources essential to bring the proposal into effect cannot be found within resources available to the faculty.

3.3.2 **Fees** (delete if not applicable):

- a fee will not be charged for this program (other than HECS)
- a fee will be charged for this program for local fee-paying students
- a fee will be charged for international students

If a fee is to be charged the Dean certifies as follows:

I have ensured that the Vice-Chancellor has been advised of the proposed fee arrangements, and note that approval of fee arrangements is needed before the new program can be implemented.

3.3.3 the proposal conforms to the University's commitment to Equal Opportunity in Education.

Statement from Head of School on Source of Additional Resources and/or Further Comments:

Dean  
/ /2005

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[DISABILITY GUIDELINES FOR ACADEMIC STAFF PREPARING COURSES](#)