THE UNIVERSITY OF WESTERN AUSTRALIA

FACULTY OF
Engineering, Computing
and Mathematics

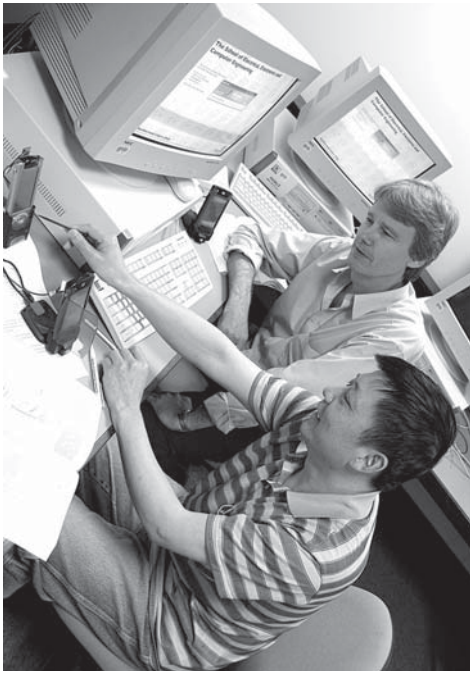
SCHOOL OF ELECTRICAL, ELECTRONIC AND COMPUTER ENGINEERING (EECE)

Masters or Doctor of Engineering

Postgraduate Coursework Programmes

- *Information and Communications Technology*
- *Microelectronics*
- *Power Systems*

School of Electrical,
Electronic and Computer
Engineering (EECE)
THE UNIVERSITY OF WESTERN AUSTRALIA



Information & Communications Technology

(MEICT) or (DEICT)

Information and Communications Technology Engineering is a broad area which spans Telecommunications, Computer Systems and Software Engineering. It is focused on the integration of large-scale information and communication systems for a vast array of new application areas, and the enabling technologies that are used to construct these systems.

The MEICT (Master of Engineering in Information and Communications Technology) is a two year (96 point) Engineering Masters programme in the ICT (Information and Communications Technology) area that includes a collection of up to 48 points of undergraduate units to allow a candidate to refresh, update or translate their existing Engineering/ Science knowledge into the ICT area. For applicants with advanced standing, i.e. a recently completed undergraduate degree in the ICT area, credit for up to 48 points may be granted to allow direct entry into the advanced ICT units. The collection of undergraduate units required to be undertaken is customized to the candidate's background and experience. The DEICT (Doctor of Engineering in Information and Communications Technology) programme builds on the MEICT with a two year (96 point) Doctoral thesis.

The advanced programme is made up of three 6 point core units spanning the ICT area:

- High-Performance Embedded Systems ELEC8315
- Advanced Wireless Communications ELEC8317
- The Software Process: Principles, Implementation and Improvement CITS 8220

Plus a substantial 18 point individual research project in the ICT area:

- Individual Research Project ELEC8310 Part 1, ELEC8311 Part 2, ELEC8312 Part 3

Plus up to two optional advanced ICT area 6 point units:

- Network Architectures for Quality of Service ELEC8316
- Applied Digital Signal Processing ELEC8351
- Digital Systems Engineering ELEC8314
- Advanced ICT Topics ELEC8313
- Advanced ICT Topics ELEC8318
- Advanced Topics in Software Engineering CITS 8229
- Creating Advanced Engineering Enterprises ELEC8319

Or plus up to two units taken from other Master's programmes available at UWA subject to prerequisites (e.g. Master of Engineering, Master of Business Administration, etc)

The likely employment opportunities for graduates of this programme is across the broad ICT area: ranging from international telecommunications carriers, mobile information systems developers, software engineering houses, through to research and development consultancies.

Lecturers and project supervisors in the programme are drawn from the School of Electrical, Electronic and Computer Engineering, the Western Australia Telecommunications Research Institute (WATRI), and the School of Computer Science and Software Engineering.

Enquires for enrolment may be directed to Mr Rob Mattaboni, School of Electrical, Electronic and Computer Engineering, The University of Western Australia (enquiries@ee.uwa.edu.au or +61 8 6488 3106).

ELEC 8310 (Part 1), ELEC 8311 (Part 2), ELEC8312 (Part 3) - Individual Project (MEICT)

Credit: 18 points (Parts 1 to 3)

Availability: Semester 1 and Semester 2

Outcomes: Students gain experience in the conduct of an investigation of a particular advanced topic in information technology and communications engineering; develop and improve their skills in sourcing and synthesis of information, problem solving, design, analysis and communicating results; and increase their level of skill in one or more of the areas of information and communications technology engineering. They are required to submit a technical dissertation on a topic approved by the Head of the School of Electrical, Electronic and Computer Engineering or the Head of the School of Computer Science and Software Engineering and to participate in any prescribed seminars.

Content: This unit is taken over three successive semesters and parts 1, 2 and 3 must be completed to fulfil the requirements of the unit. Students can commence the unit in either semester 1 or semester 2.

The unit is an individual investigation of an advanced topic in information technology and communications engineering, taken as part of the MEICT. The investigation involves the study of the problems, design and implementation of possible solutions. The unit develops skills in problem solving, design, analysis and testing. Students are required to submit a project proposal, present a seminar and submit a dissertation detailing all aspects of the project.

Assessment: This is conducted through the following means: (1) a written project proposal submitted at the end of first semester (to provide feedback to students on their progress); (2) presentation of a seminar on their project (measuring presentation skills) in the second semester; and (3) written technical dissertation at the conclusion of the project which incorporates an assessment by a committee of three members chaired by the project supervisor of the student's overall performance.

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8310

ELEC8313 - Advanced ICT Topics

Credit: 6 points

Availability: Contact the School of Electrical, Electronic and Computer Engineering

Outcomes: This unit allows one-off units in information and communications technology to be offered by visiting, research or academic staff and is made available from time to time.

Unit Web Page: http://student.ee.uwa.edu.au/elec8313

ELEC8314 - Digital Systems Engineering

Credit: 6 points

Availability: Not available in 2008

Outcomes: Students understand techniques for managing timing in digital electronic systems—covering clock distribution, management of skew, and asynchronism. They gain an understanding of realisation issues in digital electronic systems that arise because of the broadband nature of signals.

Students gain an understanding of noise management techniques applicable to digital electronic systems; are introduced to a design methodology for power supply decoupling based on analytical modelling and CAE; and develop skills in the application of the methodology.

Content: The topics covered in this unit are a review of the basics of digital systems, design processes, timing analysis and design, interpretation of timing characteristics of logic, clock distribution, skew management, pipelining, asynchronous transfers, synchronisation, metastability, handshaking, signal integrity analysis and design, review of transmission lines, factors affecting performance, models, tools and techniques for design, IBIS, circuit models, field models, eye diagram, techniques for point-to-point, point-to-multipoint, bus system, backplanes and bus logic, very high speed systems, LVDS, noise in digital systems, measurement techniques for digital systems, signal referencing, grounding, crosstalk, handling ground bounce, simultaneous switching, power distribution, decoupling, PCB zoning.

Assessment: In-depth technical competence in the subject matter is assessed by examination and assignment.

Advisable prior study: ELEC3301 Circuits and Electronic Systems 3 or equivalent

Contact hours: 36 (lectures: 24 hrs; tutorials: 12 hrs)

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8314

ELEC8315 - High Performance Embedded Systems

Credit: 6 points

Availability: Semester 1

Outcomes: Students gain an understanding of the design and development of advanced embedded systems as used in mobile telecommunications systems, intelligent transportation systems, flexible manufacturing and automation systems, and related application areas; perform problem identification, formulation and solution in the context of a systems-based approach; and gain in-depth technical competence in the area of advanced computer systems engineering for high-performance and real-time embedded systems.

Content: The topics covered in this unit are requirements analysis for high-performance embedded systems, system design for high-performance embedded systems, hardware design of high-performance embedded systems (single-board solutions, system-on-chip solutions), software design for high-performance embedded systems, testing and debugging of high-performance embedded systems (life cycle issues, risk-based test strategies, quality assessment), simulation and prototyping; real-time embedded systems—specification of real-time embedded systems (RT-UML, timed Petri nets, real-time logic), design of real-time embedded systems (RT-patterns, generalised RT-scheduling theory), performance modelling (discrete-event and hybrid control approaches), implementation, benchmarking and testing of real-time embedded systems; applications for high-performance embedded systems—intelligent and knowledge-based systems, mobile systems, and telecommunication systems.

Assessment: In-depth technical competence in the subject matter is assessed by design assignments. Teamwork is assessed in a group laboratory report and demonstration of a developed and tested system.

Advisable prior study: ELEC2303 Embedded Systems or equivalent

Contact hours: 36 (lectures: 18 hrs; tutorials: 6 hrs; labs: 12 hrs)

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8315

ELEC8316 - Network Architectures for Quality of Service

Credit: 6 points

Availability: Semester 1

Outcomes: Students understand the requirements placed on an information network by different media; the principles and requirements that govern real-time and computer data communications; and principles of synchronous, asynchronous and heterogeneous packet-switched transfer modes. Students are able to apply a network design methodology based on modelling, analysis and simulation. They gain an in-depth understanding of queuing theory, resource management, traffic management techniques, traffic flow control, fundamental performance measures such as delay, throughput, grade of service and quality of service, and the relationship between performance measures and service objectives.

Content: This unit covers a review of telecommunications networks, network architectures, resource and traffic management, the OSI reference model, layer services, synchronous transfer mode, the asynchronous transfer mode and the integrated network, link layer, multi-access protocols for local area networks, distributed LAN multi-access protocols, B_ISBN network and protocol architecture, ATM network resource management-call admission control, framework for traffic and congestion control, ATM layer bearer capabilities, deterministic cell rate bearer capability, ATM block transfer (ABT) bearer

capabilities, controlled cell transfer (CCT) bearer capability, generic flow control at UNI (GFC_U), generic flow control at NNI (GFC_N), cell transfer protocol (CTP), and inter-networking protocol (IP).

Assessment: In-depth technical competence in the subject matter is assessed by examination and assignment.

Advisable prior study: ELEC4301 Digital Communications and Networking or equivalent

Contact hours: 36 (lectures: 24 hrs; tutorials: 12 hrs)

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8316

ELEC8317 - Advanced Wireless Communications

Credit: 6 points

Availability: Semester 2

Outcomes: Students gain an in-depth understanding on the foundations of wireless communications, and are exposed to the cutting-edge research in wireless communications.

Content: The topics covered in this unit are: introduction to varieties of wireless communication systems, concepts of cellular mobile radio systems and system design fundamentals, large-scale path loss, practical link budget design, small-scale fading and shadowing, frequency-selective fading channel, Code Division Multiple Access, diversity, Multiple-Input Multiple-Output systems, Orthogonal Frequency Division Multiplexing, equalization, spatial multiplexing, space-time coding, performance analysis of convolutional codes over fading channels, turbo codes, low density parity check codes, and fountain codes.

Assessment: This consists of class participation, project work, project report and presentation. The project tests students' ability to understand, define, and solve an engineering problem in wireless communications.

Advisable prior study: ELEC4301 Digital Communications and Networking or equivalent

Contact hours: 36 (lectures: 24 hrs; tutorials/projects: 12 hrs)

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8317

ELEC8318 - Advanced ICT Topics

Credit: 6 points

Availability: Contact the School of Electrical, Electronic and Computer Engineering

Outcomes: This unit allows one-off units in information and communications technology to be offered by visiting, research or academic staff and is made available from time to time.

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8318

ELEC8319 - Creating Advanced Engineering Enterprises

Credit: 6 points

Availability: Trimester 3

Outcomes: This unit provides students with a realistic understanding of the management of the innovation process, the way in which advanced engineering companies develop the faculties to transform their ideas into products, the management of the marketing of new products and the efficient operation of the enterprise once established.

Content: This unit covers a range of subject areas including the research and development effort, raising finance, managing market introduction, development of assets to transform the technology to a marketable product, and operation of facilities.

Assessment: This consists of group assignments (30 per cent), individual assignment (50 per cent) and participation (20 per cent).

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8319

ELEC8351 - Applied Digital Signal Processing

Credit: 6 points Availability: Semester 2 (See Timetable) Old unit code: 625.664, ENGT8351

Outcomes: Students develop an understanding of a range of digital signal processing techniques and gain experience in implementing them in hardware and software. Students learn how to apply these techniques to a range of problems.

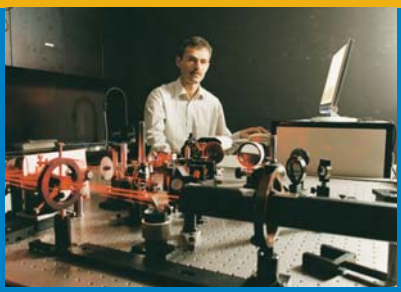
Content: This unit covers principles of signal sampling; analogue filters; digital filter design; implementation issues; the fast Fourier transform; Wiener Filters; adaptive filters; other filters; homomorphic processing; DSP application theories and examples.

Assessment: This includes an examination (70 per cent) and project work (30 per cent). The examination tests the students' understanding of the DSP techniques. The project work tests their proficiency in hardware and software implementation of the techniques and their applications.

Advisable prior study: Content of ELEC3306 Signals and Systems 3 or equivalent

Contact hours: lectures: 26 hrs; tutorials/labs: 13 hrs

Unit Web Page: http://student.ee.uwa.edu.au/units/elec8351



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