WHAT IS INSTRUMENTATION AND CONTROL ENGINEERING?
Being an engineer is about problem solving, having a design focus, and utilising technology to benefit society. Instrumentation and control engineering encompasses the design, build and management of systems that are used in a range of modern industrial settings, and is closely related to mechatronic and robotic engineering.

WHAT DOES AN INSTRUMENTATION AND CONTROL ENGINEER DO?
Instrumentation and control engineers are employed in a range of modern industrial settings such as manufacturing, environmental, health, food production, mining and energy production. They are typically employed to monitor, measure, regulate and control physical quantities like temperature, pressure and flow, and to control product movement, actuators and positioning devices for example.

WHAT SKILLS DOES AN INSTRUMENTATION AND CONTROL ENGINEER NEED?
- project management skills
- high level of technical expertise
- good communication skills
- leadership capability
- strong analytical skills
- ability to work as part of a team
- problem solving capabilities
- practical/resourceful
- creativity (invention, innovation, thinking outside box)

WHAT CAREER OPPORTUNITIES ARE AVAILABLE?
- control systems design and installation
- process control and instrumentation
- installation and management
- electronics design and manufacturing
- engineering research and development
- sales and service of technical equipment
- project and technology management

WHERE DO INSTRUMENTATION AND CONTROL ENGINEERS WORK?
- technology and manufacturing companies such as Honeywell, OEM
- energy companies such as Energy Australia
- resources companies such as BHP Billiton
- food production companies such as Arnotts
- manufacturing companies such as Visy
- institutions at both state and federal level such as Railcorp
- government and university research laboratories such as CSIRO, DSTO (Defence Science and Technology Organisation), ANSTO (Australian Nuclear Science and Technology Organisation), and university research laboratories around the world

Did you know?
Macquarie University’s Department of Electronic Engineering works with its industry partners to ensure its engineering programs remain relevant to industry needs. Through the Department’s Industry Partnership Program, undergraduate students in their final semester are eligible to undertake a 16 week industry-based internship with one of our industry partners such as Cochlear, Optus, EMC, CISRA, Honeywell, Mimix Broadband, OEM Technology Solutions, and BCS Innovations. Many of the Department’s industry partners are located in one of Australia’s leading high-technology precincts where the University’s campus is also located.
WHAT DOES AN INSTRUMENTATION AND CONTROL ENGINEER DO?

CAREER FACT SHEET

HOW MUCH DO THEY EARN?
According to GradStats 2007 the Careers Council of Australia’s annual Australian graduate survey, the median starting salary for bachelor degree Engineering graduates aged less than 25 and in first full-time employment in Australia was $50,000. This was the fourth highest starting salary of professionals in Australia in 2007. This salary ranking has been consistent for engineering for at least 5 years. By comparison, Economics, Business and Accounting graduates had a median annual starting salary of $40,000 in 2007, $10,000 less than that for engineers.

ABOUT THE ENGINEERING PROGRAM AT MACQUARIE UNIVERSITY
The Bachelor of Engineering in Instrumentation and Control Engineering at Macquarie University is a 4 year full-time degree and begins with a solid foundation of basic sciences and core electronics engineering, and then focuses on design and implementation of control systems. Optional units allow the student to develop skills in one or more related areas such as digital and analogue electronics, embedded systems, computer programming and computer engineering.

The types of units studied in instrumentation and control engineering may include the following topic areas along with a range of other units:
• analogue and digital electronics
• computer networking
• embedded systems
• computer programming
• mathematics and physics
• information technology
• wireless technology

ENTRY REQUIREMENTS
2 unit HSC Mathematics (Band 4) or its equivalent is a subject prerequisite for Physics and Mathematics units which form part of the Bachelor of Engineering degree. Students not meeting this requirement will need to enrol in an additional mathematic unit in their first year of study. A combination of higher levels of mathematics, physics, chemistry, engineering studies, senior science, information processes, technology or software design and development are also strongly recommended. Other units taken as part of the degree may have assumed knowledge, prerequisites or recommended studies. Therefore, students should refer to the University Handbook for full degree requirements (www.handbook.mq.edu.au).

OTHER CAREER FACT SHEETS IN THIS SERIES
• electronics engineering
• computer engineering
• software engineering
• photonics engineering
• telecommunications engineering
• wireless engineering

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Double-Degree Option
The Bachelor of Engineering combined with Bachelor of Science allows students to undertake a computing major along with a major in software engineering or telecommunications engineering. The Bachelor of Engineering with Bachelor of Commerce combines software engineering or telecommunications engineering with an economics major. The Bachelor of Engineering with a major in any of the seven engineering specialisations can also be combined with the Bachelor of Business Administration. These degrees offer an efficient way for students to broaden their skills and obtain two qualifications in five years.