



**THE DEPARTMENT OF
ELECTRICAL ENGINEERING
MONASH UNIVERSITY**



and

**TELECOM AUSTRALIA
RESEARCH LABORATORIES**

present

BASIC DIGITAL TRANSMISSION SYSTEM THEORY

**An intensive 2-week course
at Monash University
on May 18-29, 1987**

Organisations which are active in the field of digital communications need to maintain their competitiveness in an expanding market.

Their engineering personnel therefore must have a firm grasp of the fundamentals of digital transmission theory and techniques.

This course addresses these fundamentals.

**Organised in collaboration with
The Centre for Continuing Education
Monash University**

Ancora Imparo I am still learning

BASIC DIGITAL TRANSMISSION SYSTEM THEORY

May 18-29, 1987

THE NEED FOR THE COURSE

With the worldwide move to digital transmission in communication networks for data, voice and other forms of information, systems and design engineers face a new challenge. Staff of the Department of Electrical Engineering at Monash University and the Telecom Australia Research Laboratories joined together to present this course for engineers in this fast growing area. It has been run on seven occasions, with the participation of 180 engineers.

The course was first designed in response to a study which highlighted Telecom Australia's need to develop its engineering knowledge base in digital transmission theory and techniques.

This need also exists in a variety of other organisations whose products or whose own communication systems exploit the newest transmission technology.

Many electrical engineers would have studied, during their undergraduate courses, linear systems and random process theory. To work at today's frontiers of the communications field, they now need to extend and update these concepts, in order to cope with the design of digital transmission equipment.

WHO SHOULD ATTEND

The course is designed expressly for those professionals working on the development of digital transmission systems. Originally an in-house course for Telecom Australia, it is now being opened to engineers from industry and from other government organisations.

IN TWO INTENSIVE WEEKS YOU WILL BENEFIT FROM

- gaining a fundamental understanding of the digital transmission system theory and its application in design situations.
- obtaining new insight into the growing area of worldwide, competitive activity in digital transmission system developments.
- awareness of the present and future directions of digital transmission systems within Telecom Australia.

THE COURSE LEADERS

The Course Manager is **Associate Professor Bill Brown**, of the Monash Department of Electrical Engineering.

Principal lecturers from Monash who will provide the basic theoretical material for the first components of the course are **Dr Don Keogh**, **Dr Khee Pang** and **Dr Kim Ng**, all of the Department of Electrical Engineering.

Dr Bruce Clarke, **Dr Reg Coutts** and **Mr Grant Nicholson**, of Telecom Australia, will lead the components on applications of the theory to practical design problems.

Don Keogh is a Lecturer and specialises in the area of communications systems. He took a leading role in the establishment of this course in 1981 and has been one of the main speakers at each of the seven courses held since then.

Khee Pang is a Reader and specialises in the area of circuit theory and digital filters. He also has been heavily involved in previous courses.

Kim Ng is a Senior Lecturer. His background is in electronic circuits and instrumentation. He is the author of a text book on circuit theory.

Bruce Clarke is a graduate of the University of New South Wales and has been carrying out research at the Telecom Australia Research Laboratories in various aspects of automatic and adaptive networks and ISDN basic access transmission systems.

Reg Coutts is a graduate of the University of Adelaide. He is Section Head of Radio Systems at the Telecom Australia Research Laboratories. His section is responsible for research into new radio systems for both fixed and mobile applications. Having previously concentrated on digital microwave systems, his current work concerns next generation digital mobile and personal communications.

Grant Nicholson is a graduate of the University of Tasmania. He is presently a project leader at the Telecom Australia Research Laboratories, concerned with investigating systems aspects of optical communication, including both direct-detection and coherent transmission systems, semiconductor lasers and optical fibre characterisation.

COURSE OUTLINE

The course runs from 9.00 am to 5.00 pm on each of the ten weekdays from Monday, May 18 to Friday, May 29, 1987.

LINEAR SYSTEMS. . . KIM NG

- Time and frequency domains.
- Analysis of linear systems, including convolution and Fourier transforms.
- Application to digital transmission systems.

RANDOM PROCESSES. . . KHEE PANG

- Basic probability theory.
- Random processes; auto-correlation and power spectral density.
- Response of transmission systems to random inputs.

DIGITAL TRANSMISSION. . DON KEOGH

- Linear representation of digital signals.
- Band limiting, inter-symbol interference, Nyquist pulse shaping, roll-off.
- Average power spectral density of digital signals.
- Error probability formula for multi-level digital signals.
- Line coding.
- Modulated digital signals: Linear — digital AM (DSBAM, DSBAMSC, QAM, PM, VSBAM, SSBAM); nonlinear — digital FM.
- Time and frequency domain representations.
- Phase jitter tolerance.
- Application of baseband error probability formula to modulated digital signals.

TRANSMISSION TECHNIQUES FOR ISDN. . . BRUCE CLARKE

- Introduction to Integrated Services Digital Network basic access transmission systems designed to operate at 160 kbit/s in full-duplex over existing copper pair cable.
- Discussion of adaptive digital echo cancellers and decision feedback equalizers.
- Analysis of the adaption of decision feedback equalizers when a stochastic iteration algorithm is used.

DIGITAL RADIO. . . REG COUTTS

- Effects of frequency selective fading on the performance of high capacity digital trunk radio systems.
- Diversity and equalization countermeasures.
- Local access radio systems, including urban and rural terrestrial and satellite systems and developments in digital mobile radio systems.

OPTICAL FIBRE SYSTEMS. . . GRANT NICHOLSON

- Introduction to the technology of optical fibre systems and components.
- Analysis of transmission performance of "present-day" direct detection systems and future coherent systems.
- Applications to some example link designs for multimode and single mode systems.

APPLICATION FOR REGISTRATION: "BASIC DIGITAL TRANSMISSION THEORY", MAY 18-29, 1987

Title	First Name	Position or Occupation	Surname
Organisation	Telephone		
Postal address			Postcode

FEES: (insert relevant items)

STANDARD FEE	\$1,750.00 \$
REDUCED FEE for registration by 1 May, 1987	\$1,650.00 \$
ACCOMMODATION: nights at	\$20.60 \$
Arrival /5/87	
Departure /5/87	TOTAL: \$
<input type="checkbox"/> Please provide information about nearby motels	(code 3.124.486.160)

PAYMENT (tick as appropriate)

<input type="checkbox"/> Cheque payable to MONASH UNIVERSITY enclosed	
<input type="checkbox"/> Cheque to follow	Authorising signature:
<input type="checkbox"/> Invoice my organisation
Debit <input type="checkbox"/> BANKCARD <input type="checkbox"/> VISA <input type="checkbox"/> MASTERCARD	
Account No.	
Expiry Date:	Account Name:
Signature	

MAIL TO: REGISTRATIONS, C.C.E. MONASH UNIVERSITY, CLAYTON, VIC 3168 or FAX TO: C.C.E. MONASH (03) 543 4061

**BASIC DIGITAL
TRANSMISSION
SYSTEM THEORY
May 18-29, 1987**

ACKNOWLEDGEMENTS: If your registration form is received after all places are filled, it will be returned to you immediately. If it is not returned, please assume that it has been accepted; you should then expect to receive further details soon after 4 May, 1987.

ACCOMMODATION: A limited number of rooms has been reserved at Normanby House, a conference centre at Monash University. The cost is \$20.60 per night, for room only. The total cost for all nights is payable with registration.

Information about nearby motels can be provided on request.

ENQUIRIES: For information about services and registrations, contact the Centre for Continuing Education, (03) 565 4716. After Hours messages: (03) 565 4718. For additional information about the workshop itself, please contact the Course Manager: Associate Professor Bill Brown, (03) 565 3504.

VENUE: Faculty of Engineering, Monash University . . . full details will be sent to registrants. Car parking is available on campus.

REGISTRATIONS: The number of places is limited to 26. Telecom Australia has priority for its requirements, expected to be 15 to 20 places. The remainder will be filled in order of receipt of registrations.

Places cannot be reserved by telephoned enquiries alone; however, a place can be reserved by sending a copy of the completed registration, marked "Cheque to follow" or "Invoice my organisation" by Facsimile Transmission to Monash University at (03) 543 4061, either from your facsimile machine or through Australia Post's Intelpost service.

FEES: Standard fee: **\$1,750.00**

A reduced fee of \$1,650.00 is available for registration by 1 May, 1987.

Fees cover lunches, notes and a textbook.

CANCELLATION POLICY: Full refund of registration fee is available if notice of withdrawal is received 2 clear weeks before the starting date of an activity. If later notice is given, 50% of the fee is refundable. In the event of failure to attend without prior notice, the full fee is charged.

Confirmation of notice of withdrawal must be received in writing before refund procedures can be commenced.

CENTRE FOR CONTINUING EDUCATION
MONASH UNIVERSITY, CLAYTON, VIC 3168

POSTAGE
PAID
AUSTRALIA

