

Issue 2

Summer 2009

CALL FOR PAPERS

The Institution of Electronics is this month putting out a call for papers for its first 'new style' exhibition and conference.

Papers are particularly welcome from university engineering departments which present the results of research in the electronics field. Team presentations with a practical theme are especially welcome as the Institute is looking to highlight and promote practical achievements and developments with an equal emphasis to academic contributions. Academic contributions in the form of learned papers are also welcome.

It is hoped that the exhibition will run alongside the conference. Details of space costs will be posted in due course.

Papers and enquiries should be sent to jim@spirecity.go-plus.net.

CHALLENGING ALL YOUNG ENGINEERS

Can you or your team design and build a robot? If so the Institute of Electronics would like to hear from you, as it is hoped that part of our exhibition and conference will feature an exciting and dynamic 'Robot Wars' contest – for which a prize will be awarded for the most successful robot. Prizes may also be awarded for the design and building of 'house robots' that will keep contestants in check.

There are no eligibility criteria, other than that children should only design and build under adult supervision. So, come along and help the Institute of Electronics revive this popular spectator show sport. You may even get some TV coverage.

INSTITUTE PROMOTIONAL LECTURES

The Institute of Electronics is pleased to announce that a series of promotional lectures is now in preparation.

The electronics field is vast and vibrant and the Institution of Electronics is playing an important role in representing this sector by forging links between industry and education.

The Institute believes that it can bring benefits to both industry and academia by helping to raise the profile of talented individuals, organisations and institutions through the promotion of excellence in achievement. Great work continues to be done in the U.K. electronics sector, but it is still greatly undervalued.

The aim of these lectures is to give individuals, organisations and academic institutions a greater voice with more media coverage. Talent needs to be recognised and the Institute seeks to ensure that it is recognised through its various membership grades. From computers to battleships, space rockets to frying pans, technological development is ongoing for the electronics professional.

Help us to give your professionals a voice by supporting our promotional lecture programme. This will explain the benefits of becoming a sponsoring organisation of the Institute, as well as how graduate members can design and shape their industry.

For more information about our promotional lecture programme and the benefits that it can bring to your school, please contact the Institute on 0151 608 4236, or send us an e-mail at info@i-e.org.uk.

MORE BOOKS AVAILABLE

The Institute is pleased to announce that more titles are now available for loan or purchase from the Institute. These are:

- (i). Technology of Instrumentation, by Eric B. Pearson, published by The English Universities Press Limited, 1957 (202 pages).
- (ii). Solution of Problems in Telecommunications, by C.S. Henson, published by Sir Isaac Pitman and Sons, 1956 (258 pages).
- (iii). Stereo F.M. Radio Handbook, by P. Harvey and K.J. Bohlman, published by Norman Price, 1974 (203 pages).
- (iv). Ions, Electrons and Ionizing Radiations (Eighth Edition) by J.A. Crowther, published by Edward Arnold, 1959 (322 pages).
- (v). How to use Integrated Circuit Logic Elements, by J.W. Streater, published by W. Foulsham and Co. Limited, 1969 (136 pages).

In 'Technology of Instrumentation' the author introduces the theory and practice involved in the instrumentation of measurement, control and computing processes for scientists and engineers. Edited by Sir Graham Sutton the book aims to answer the question of how to design an instrument which will measure a variable quantity accurately and consistently.

The principal contents of the book are:

The basic principles of measurement (including calibration procedure and errors in measuring instruments).

Basic characteristics of measuring instruments with a moving element (including the transient condition, damping ratio, and response to a step function of displacement).

The dynamic accuracy of an instrument (including input as a function of time, responses to constant velocity, acceleration and sinusoidal input, and the resonant condition).

Laboratory techniques for measuring the response characteristics of instrument movements and simple servomechanisms (including measuring the transient and measurements on the harmonic response).

Instrumentation applied to control processes (including the feedback principle and comparison of kinetic and process control systems).

Improvement of servomechanism performance (including methods for increasing damping, use of negative velocity and acceleration feedback, and discontinuous systems).

Stability criteria for linear servomechanisms (including requirements for a stable system, the Hurwitz Stability Criterion, transfer functions, and Nyquist Diagrams).

Components used in servomechanism layouts (including servo-amplifiers, electronic and feedback amplifiers, and the inclusion of gear ratio in performance calculations).

Instrumentation of mathematics (including accuracy of computing devices and instruments for integration and area measurement).

The 'Solution for Problems in Telecommunications' consists of worked examples from problems of the time in telecommunications and electronics from the London University Final Examinations and the Graduateship Examination of the Institution of Electrical Engineers in Radio Communication.

Each chapter contains some theoretical work consisting of brief notes dealing with one or two particular aspects of the subject. The remainder consists of a combination of fully worked out examples and problems, with answers for the student to solve.

There are sixteen chapters in all dealing with General Circuit Theory, The Theory of Coupled Circuits, Voltage Amplifiers, A.F. Power Amplifiers, R.F. Power Amplifiers, Negative Feedback Amplifiers and Cathode Followers, Valve Oscillators, Modulation, Detectors and Frequency Changers, Line Transmission, Filters and Attenuators, Loaded Lines, High-Frequency Feeders and Waveguides, Aerials and Radiation, Acoustics and Miscellaneous Problems.

As part of the Engineering Degree series, the book would make interesting reading for those wishing to make comparisons between these examinations and today's equivalents.

Harvey and Bohlman's book presents a survey of the complete stereo system from transmitter to listener. It begins with the basic ideas of stereophonic sound and then proceeds on to the subjects of transmitter, encoding and modulation, and the receiver (tuning and demodulating). There is then a chapter on decoding the multiplex signal followed by one on typical receiving and decoding circuits. The last three chapters

cover decoding adjustments, V.H.F. waves and aerials, and the reproduction of stereo sound. Appendices cover intensity stereophony, the side frequencies and bandwidth of an F.M. wave, switched decoding and crosstalk, and a table of angle and distance errors.

J.A. Crowther in 'Ions, Electrons and Ionizing Radiations' begins by introducing the theory of electrons before proceeding with detailed chapters on the passage of a current through an ionised gas, the properties of gaseous ions, the charge of an ion, and ionisation by collision. These are then followed by chapters on the phenomenon of the discharge tube, cathode rays and positive rays, emission of electricity by hot bodies, photo-electricity, X-rays, Alpha Beta and Gamma radiation, Cosmic radiation, the physics of the nucleus, nuclear energy, structure of the atom and radioactive concepts. This is the eighth edition of a book originally published in 1919.

In 'How to use Integrated Circuit Logic Elements' Jack W. Streater highlights the two main twentieth century 'revolutions' in electronics, namely the transistor and the integrated circuit. He distinguishes between the linear and digital types of integrated circuits at a time when the domain of digital circuits was beginning to widen, with engineers and technicians now having both to consider what they can do with linear integrated circuits and what they may be able to do with digital circuits.

Seven chapters provide a broad general introduction to integrated-circuit logic technology as it applied in the late 1960s covering binary numbers, Boolean algebras, gates, gate combinations, bistable elements and their uses, how logic families compare, and using off-the-shelf logic elements (with a description of the technique of 'Breadboarding', testing, and troubleshooting).

These and other archive books may be loaned or purchased from the Institute. Contact A. Hollinshead at info@i-e.org.uk.

CROSFIELD ELECTRONICS: A CASE STUDY IN QUALITY FUNCTION DEPLOYMENT

Crosfield Electronics is an international company with a turnover of £230 million, employing 2,100 people, mostly in the U.K. It produces electronic imaging equipment, colour scanners, page planners, and creative design systems for the printing industry. The company is based in Hemel Hempstead with further facilities at Peterborough and Milton Keynes, and a wholly owned subsidiary producing specialised optical equipment at Basildon. The company also has sales offices in Europe, Canada and Australia and uses distributors elsewhere.

The company was used to using short-cycle manufacturing, but suffered from many of the classic problems that have bedevilled companies in the electronics industry as well as elsewhere. In particular, products were often late to market with a high level of engineering changes just before and after launch.

In order to try to compensate for these difficulties the company introduced Quality Function Deployment (Q.F.D.). Under the direction of the quality council and beneath

that the 'forward engineering steering team', Q.F.D. was introduced with the deputy manager of technical operations becoming its internal sponsor.

A complex project (a colour scanner, value approximately £100,000, with 10,000 components) was chosen initially to pilot the technique, which yielded 120 customer requirements and 140 product characteristics.

Each team member was given three days of training which was regarded as just sufficient, and external costs related to Q.F.D. implementation were estimated at £75,000. About 2 to 2.5 man-years were required for this initial Q.F.D. project.

The benefits reported from Q.F.D. are:

- (i). A very real understanding of customer requirements.
- (ii). The ability to translate somewhat vague customer requirements into measurable product characteristics.
- (iii). Company performance competitively benchmarked.
- (iv). Improved team working following from the establishment of a multi-disciplinary Q.F.D. project team.
- (v). A well-defined and understood product development process which has been established in parallel with the Q.F.D. exercise.

For companies that are considering using Q.F.D., Crosfield recommend:

Start with a small, self-contained project.

Resource it full-time with a maximum of six to seven people.

Use Q.F.D. in the product definition phase for enhancing an existing product.

Plan and review as a team, but do the work off-line.

Keep the customer requirement on the chart to about 30 to 50.

Ensure the support and championship of senior management.

This case study is taken from 'Deming and Juran: Gift to the World' by Professor Mohamed Zairi, Juran Chair in T.Q.M. at the University of Bradford, which is published by Spire City Publishing. This may be purchased (price £32 for Institute members, £48 for non-members) by contacting jim@spirecity.go-plus.net.

NEW AFFILIATE MEMBERSHIP GRADE

From 1st. April 2009 the Institute is introducing a new Affiliate Membership grade for the over 25s. Designed to complement the Student member grade, the Affiliate grade is designed for those with an interest in learning, but not necessarily well qualified.

The membership fee for this grade is £15.00 with a £15.00 one-off joining fee.

Those interested should contact Tim Hatch, Membership Secretary on 0151 608 4236.

POSITIVE START TO RADIO BROADCASTING

Flame Christian and Community Radio has reported a “positive start” to its recently launched Institution approved training course in radio broadcasting. With the help of three local schools and assistance from Chester University in the writing and preparation of jpegs, the course has been designed to allow trainees to prioritise topics in radio broadcasting and webcasting from a standard list of topics. Vodafone have also pledged their support for the initiative.

Further information concerning this initiative may be obtained from Norman Polden at the Institute.