WHAT YOU WILL GAIN:

• Skills and know-how in the latest industrial data communications, networking and IT
• Practical guidance from experts in the field of data communications and networking
• 'Hands on' knowledge from the extensive experience of the instructors, rather than from only the theoretical information gained from books and college reading
• Credibility as a data communications expert in your firm
• Networking contacts in the industry
• Improved career prospects and income
• An EIT Advanced Diploma of Industrial Data Communications, Networking and IT
Introduction

Gain in-depth skills and knowledge by undertaking this Advanced Diploma in Industrial Data Communications, Networking and IT. Delivered by live distance learning and presented by some of the leading industrial data communications and IT instructors in the world today. There is a serious shortage of industrial data communications and industrial IT engineers, technologists and technicians in the world due to these new technologies only recently becoming a key component of modern plants, factories and offices. This critical shortage of experts in the area has been accentuated by retirement, restructuring and rapid growth in new industries and technologies.

Businesses throughout the world comment on the difficulty in finding experienced industrial data communications and industrial IT experts, despite paying outstanding salaries. Two years ago, a tremendous need developed for industrial network security experts and others who understood how to configure the basic plumbing of the internet - routers and switches. The interface from the traditional SCADA system to the web and SQL databases has also created a new need for expertise in these areas. Specialists in these areas are few and far between.

Many of these universities and colleges that do teach these topics focus more on the commercial implementation of data communications and IT from a theoretical point of view; lecturers often have little experience in industry due to the difficulty in attracting good engineers and technologists from the highly paid private sector.

The aim of this 18 month e-learning program is to provide you with core skills in working with industrial data communications and industrial IT systems and to take advantage of the growing need by industry.

The topics that will be covered are derived from the acclaimed IDC Technologies’ programs attended by over 500,000 engineers and technicians during the past 20 years. The program is composed of 72 topics, which will give you maximum, practical coverage in the field of Industrial Data Communications and Industrial IT and comprise of Data Communications, Networking and Protocols, SCADA, PLCs and Data Acquisition, Industrial IT, Programming and Project Management.

The format of presentation - live, interactive distance learning with the use of remote labs means that you can hit the ground running and be of immediate benefit to your company or future employer.

"If you want to improve career prospects and be trained by excellent trainers with a thorough knowledge of the industry and train at your own pace then I would recommend this program."

Gary Burrowes, BHP Billiton

"This has been the best study process I have gone through and for advancing the career it is a must. The program content is extremely good and practical as I have baffled my engineers with some of the questions in the assignments making them question the content they actually studied."

Henk Barnard

To enrol please contact enquiries@eit.edu.au

EIT Program Delivery Methodology

Not all e-learning is the same. See why our methodology is so unique and successful.

Visit:
The EIT (and many individual programs) has received recognition, endorsement and/or accreditation as a training provider from authorizing bodies based around the world, including those listed below. Please ask us for specific information for your location.

AUSTRALIA

The Engineering Institute of Technology was declared an educational institution under Section 10 of the copyright Act 1968. The notice was published in accordance with section 10A(4) of the act in the Commonwealth of Australia’s Business Gazette (number B56): “The Engineering Institute of Technology declares that its principal function is the provision of programs of study or training for the following purpose: the continuing education of people engaged in a particular profession or occupation.” – Dated 8th November 2011.

The Engineering Institute of Technology (EIT) is a private Registered Training Organization (RTO) – provider number 51971. EIT is registered with and regulated by the Australian Skills Quality Authority (ASQA). ASQA is the national regulator for Australia’s vocational education and training sector. They regulate programs and training providers to ensure nationally approved quality standards are met.

Many of the programs offered by EIT are nationally accredited and recognized qualifications and are listed on training.gov.au (TGA). TGA is the official National Register of information on Training Packages, Qualifications, Programs, Units of Competency and Registered Training Organizations (RTOs). EIT qualifications accredited to date can be viewed on EIT’s registration page on TGA under the “Scope” tab. You can find EIT on TGA by searching for our provider number – 51971. Programs listed on EIT’s scope have been approved for delivery in all Australian states and territories. Please note that many additional programs are also in the process of accreditation.

The Advanced Diploma of Industrial Data Communications, Networking and IT [S2552WA] is a nationally accredited and recognized qualification under the AQF. The Australian Qualifications Framework (AQF) is the national policy for regulated qualifications in the Australian education and training system.

Members of Engineers Australia (EA) - are entitled to claim CPD hours for private study, short programs, and learning activities at the workplace. CPD hours can be claimed for our programs in most cases, but we would always advise individual members to check with EA regarding specific programs.

NEW ZEALAND

The New Zealand Qualifications Authority recognizes individual qualifications gained overseas on a case-by-case basis. Advanced Diplomas, for example, when registered at the time of award under the Australian Qualification Framework (AQF) are typically recognized as broadly comparable to a National Diploma at level 6 on the NZQF.

SOUTH AFRICA

The Engineering Council of South Africa (ECSA) which aims to promote a high level of education and training of practitioners in the engineering profession, has validated a large number of EIT programs. Members can check details on the ECSA website. South African students who successfully complete an EIT Advanced Diploma and other qualifications have the option to apply for recognition by SAQA, who have determined in the past that an Australian Advanced Diploma program is at Level 6 in the South African National Qualifications Framework (equivalent to Higher Diploma) in South Africa’s educational system. However, in most cases formal individual recognition by SAQA is not required as the international validity and accreditation of this credential is very sound.

UNITED STATES

IEEE is the world’s largest professional association advancing innovation and technological excellence. EIT is an IEEE Continuing Education Provider. IEEE Continuing Education Programs are peer-reviewed by content experts. This peer review guarantees both quality of the technical content of learning materials, as well as adherence to IEEE’s strict criteria for educational excellence. All programs that pass this strict process are entitled to award IEEE Continuing Education Units (CEUs), recognized as the standard of excellence for continuing education programs in IEEE’s fields of interest.

The International Society of Automation (ISA) is a leading, global, non-profit organization that sets the standard for automation around the world. ISA develops standards, certifies industry professionals, provides education and training, publishes books and technical articles, and hosts conferences and exhibitions for automation professionals. ISA has reviewed the curricula of the programs offered by EIT as they relate to the instrumentation, control and automation discipline and are enthusiastic about promoting their availability to the automation community.

UNITED KINGDOM

Nationally recognised qualifications that have been achieved at EIT can be compared by UK NARIC to the UK framework. UK NARIC is the UK’s national agency responsible for the recognition of qualifications from overseas and provides services for individuals and organizations to compare international qualifications against UK qualification framework levels. UK NARIC is managed by ECCIT Ltd (see http://www.eccitis.co.uk/naric/Default.aspx) which administers the service for the UK Government. Graduates of EIT’s Advanced Diploma programs in the UK can be confident that their international qualification has been officially evaluated as comparable to the BTEC/SQA Higher National Diploma (HND) standard/Foundation Degree Standard. A BTEC Higher National Diploma is at the same level of the National Qualifications Framework as NVQ/SVQ Level 4. Recognition will be at a higher level for graduate programs.

The Institute of Measurement and Control in the United Kingdom is Britain’s foremost professional body for the Automation Industry. An EIT Advanced Diploma is recognized by the Institute of Measurement and Control as contributing to the ‘initial professional development’ required for eventual registration as Chartered or Incorporated Engineers. The Advanced Diploma is also approved by the Institute as providing CPD.

CANADA

EIT is a Participating Partner with the Engineering Institute of Canada [EIC] and EIT programs can be utilised by members to register for Continuing Education Units (CEUs). EIC’s Continuing Education Program is supported by The Canadian Council of Professional Engineers, The Association of Consulting Engineers of Canada, and The Canadian Academy for Engineering. EIC is a member of the International Association for Continuing Education and Training, with headquarters in Washington, DC.

OTHER COUNTRIES

Students who successfully complete an EIT Advanced Diploma and other qualifications may be able to apply for recognition of their qualification within the local (home country) education system. Many countries have a process for “recognition of foreign qualifications” which is utilised by new residents when they have qualifications earned overseas. Although you will be studying from your home country you will be awarded an Australian qualification from the EIT, so your EIT qualifications may be able to be recognized as a “foreign qualification” if you apply through your local system. If you would like to find out more, please contact your local education authorities because it is not practical for the EIT to know the systems that apply in all countries. However, in many cases formal individual recognition within the home country may not be required because the international validity and accreditation of this credential is very sound.

Members of other engineering organizations may be able to claim credit for professional development and are advised to check with their own organization.

For additional information please see http://www.eit.edu.au/international-standing.
Program Structure
The program is composed of 22 modules, which cover four main engineering threads to provide you with maximum practical coverage in the field of industrial data communications.

- Data Communications, Networking and Protocols
- SCADA, PLCs and Data Acquisition
- Industrial IT and Programming
- Project Management for Industrial Data Communications and IT

The modules will be completed in the following order:
1. Industrial Data Communications
2. Industrial Ethernet
3. Wireless Communication Systems
4. Field Buses
5. Fiber Optics
6. DNP3 and IEC 60870-5 for SCADA
7. TCP/IP and VoIP
8. Routers and Switches
9. Modbus
10. OPC
11. PLCs
12. E-Manufacturing, MES and Supply Chain Management
13. IEC61131-3 for PLC Programming
14. SCADA and Data Acquisition
15. Industrial Network Security
16. HTML/Web Design
17. Algorithm Design
18. C++ Programming
19. SQL Databases
20. Windows Administration
21. Project Management
22. PC Hardware and Troubleshooting

Presentation Format
The program features real-world applications and uses a multi-pronged approach involving interactive on-line webinars, simulation software and self-study assignments with a mentor on call.

The program consists of 72 topics delivered over a period of 18 months. Presentations and group discussions will be conducted using a live, interactive software system. For each topic you will have an initial reading assignment [which will be delivered to you in electronic format in advance of the online presentations]. There will be coursework or problems to be submitted and in some cases there will be practical exercises, using simulation software and remote labs that you can easily do from your home or office.

You will have ongoing support from the lecturers via phone, fax and e-mail.

Live Webinars
During the program you will participate in 72 live interactive sessions with the lecturers and other participants from around the world. Each webinar will last approximately 60 to 90 minutes, and we take student availability into consideration wherever possible before scheduling webinar times. Contact us for details of webinar session scheduling. All you need to participate is an adequate Internet connection, speakers and a microphone. The software package and setup details will be sent to you prior to the program.

Prior Learning Recognition and Exemptions
The EIT can give you full or partial credit for modules where you can demonstrate substantial prior experience or educational background. An assessment fee may apply. If you wish to find out more please ask us for your copy of the policy for recognition of prior learning.

Time Commitment for the Program
You will need to spend an estimated 6-10 hours per week. This includes the reading of the material prior to your attendance at each hour webinar [45 minutes with 15 minutes for discussion] and the time needed to complete assignments for submission. This time would be required to ensure the material is covered adequately and sufficient knowledge is gained to provide sound, enduring and immediately useful skills in engineering. The EIT operates almost all year long, so your studies will continue most weeks of the year to enable you to achieve the qualification in an accelerated time period when compared to a traditional semester-based system.

Who Should Attend
Anyone who wants to gain solid knowledge of the key elements of industrial data communications to improve their work skills and to further their job prospects:

- Electrical Engineers and Electricians
- Maintenance Engineers and Supervisors
- Energy Management Consultants
- Automation and Process Engineers
- Design Engineers
- Project Managers
- Instrument Fitters and Instrumentation Engineers
- Consulting Engineers
- Production Managers
- Chemical and Mechanical Engineers
- Instrument and Process Control Technicians

To enrol please contact enquiries@eit.edu.au
Practical Exercises, Remote Labs and Assignments

You will participate in practical exercises using a combination of remote laboratories and simulation software, to ensure you get the requisite hands-on experience. This will give you a solid practical exposure to the key principles covered in the program and ensure you are able to put theory into practice.

As research shows, no matter how gifted and experienced an lecturer [and we believe ours are some of the best worldwide], no one learns from an lecturer only presenting program materials to them in a lecture format. It is only by the additional activities of hands-on exercises using simulation software, remote laboratories, practically based assignments and interactive discussion groups with both your peers and the lecturer that you are able to internalize this knowledge, "take ownership of it" and apply it successfully to the real world. You should note that there is some degree of overlap between the practical sessions between the different units to reinforce the concepts and to look at the issues from different perspectives.

Traditional distance learning thus presents challenges in achieving these goals but we believe today with the modern e-learning technologies available combined with outstanding lecturers that we can achieve these goals and give you an equivalent or indeed even better experience than on a traditional university campus. Practical sessions may be added, deleted or modified by the lecturers to ensure the best outcome for students.

Benefits of Live E-learning

- Attend lessons in a live, virtual classroom with your instructors and fellow students
- Upgrade your skills and refresh your knowledge without having to take valuable time away from work
- Receive information and materials in small, easy to digest sections
- Learn from almost anywhere - all you need is an Internet connection
- Have constant support from your program instructors and coordinator for the duration of the program
- Interact and network with participants from around the globe and gain valuable insight into international practice
- Learn from international industry experts
- Live interactive webinars, not just a 'book on the web'
- Receive an EIT Diploma of Industrial Data Communications, Networking and IT

About the Engineering Institute of Technology (EIT)

The key objective of the Engineering Institute of Technology (EIT) is to provide an outstanding practical engineering and technology education; from Diplomas and beyond. The finest engineering lecturers and lecturers, with extensive real engineering experience in industry, are drawn from around the world. The learning is gained through synchronous, online [e-learning] technologies. The EIT offers awards in a growing array of engineering fields.

Many [perhaps, most] engineering faculties at universities and colleges experience a significant challenge delivering the program-work affordably and with excellence. The EIT achieves this using online based education - economical class sizes are attainable, international experts are engaged to instruct and remote laboratories and simulation software are employed. The EIT is a sister company of the well known and reputable engineering training organisation, IDC Technologies. IDC has been operating for over 20 years, from offices throughout the world, delivering practical short programs to well over 500,000 engineers and technicians.

For more information or to register, please contact us at enquiries@eit.edu.au

Why EIT?

- Our lecturers are selected and recruited from amongst the top engineers/lecturers in their field - worldwide. These presenters are highly skilled at presenting challenging concepts and ideas to students of varying levels and abilities.
- As shown in the detailed program prospectus, the programs are aimed at practising professionals giving hard-hitting practical know-how relevant to today's market and is aimed at people working in industry. We design and select Case Studies and practical exercises in the program based on real-world business requirements.
- Feedback from the tens of thousands of students we have trained over many years has allowed EIT a unique understanding of real world business requirements and we have tailored the program accordingly.
- We have experience in training over 500,000 engineers and technicians throughout the world and have built up a library of outstanding reference materials which focus on what engineers and technicians need in their work today in industry and mining. The value of these references is considerable and they are a great asset to industry professionals. These reference materials are included in the cost of the program.
- The program content is challenging and designed for engineers and technicians already working in industry. We assume a general understanding of the demands of the workplace. A student without practical experience would be unsuited to the program.

Program Fees

Your program fees include weekly webinars with leading engineering and technical experts, 30 technical eBooks, all program materials, software and postage, plus grading and support from the program coordinators and lecturers. We provide payment options and can accept fees in a variety of currencies. Please contact your advisor for fees in an appropriate currency for your location.
Comprehensive e-Books and Associated Documentation

You will receive 30 of our up-to-date technical, searchable, e-Books to add to your library. Together these texts contain over 8000 pages of valuable know-how distilled from years of experience in presenting these programs throughout the world.

1. Practical Data Communications and Networking for Engineers and Technicians
2. Practical DNP3, 60870.55 and Modern SCADA Communication Systems
3. Practical Troubleshooting and Problem Solving of Ethernet Networks
4. Practical Fibre Optics for Engineers and Technicians
5. Practical Troubleshooting and Problem Solving of Industrial Data Communications
6. Practical Fundamentals of Telecommunications and Wireless Communications
7. Practical Fundamentals of Voice over IP (VoIP) for Engineers and Technicians
8. Industrial Network Security for SCADA, Automation, Process Control and PLC Systems
9. Practical Programmable Logic Controllers (PLCs) for Automation and Process Control
10. Practical Fundamentals of OPC
11. Practical Industrial Programming Using 61131-3 for PLCs
12. Practical Fundamentals of E-Manufacturing, MES and Supply Chain Management
13. Practical Project Management for Engineers and Technicians
14. Engineering Leadership - Making the Transition from Engineer to Leader
15. Practical Troubleshooting and Problem Solving of Modbus Protocols
16. Practical Radio Telemetry Systems for Industry
17. Practical Routers and Switches [including TCP/IP and Ethernet] for Engineers and Technicians
18. Practical TCP/IP and Ethernet Networking for Industry
19. Practical Digital Signal Processing for Engineers and Technicians
20. Practical Industrial Electronics for Engineers and Technicians
21. Practical Alarm Management for Engineers and Technicians
22. Practical Distributed Control Systems (DCS) for Engineers & Technicians
23. Practical Troubleshooting of Data Acquisition and SCADA Systems
24. Practical Instrumentation for Automation and Process Control
25. Practical SCADA Systems for Industry
26. Practical Troubleshooting of Instrumentation, Electrical and Process Control
27. Leading Your Engineering Team to Top Performance
28. Practical Specification and Technical Writing for Engineers and Other Technical People
29. Electrical Power System Fundamentals for Non-Electrical Engineers
30. Practical Earthing, Bonding, Lightning & Surge Protection

Please Note: Students who choose to pay upfront will receive all 30 e-Books in advance. If you opt to pay by installments you will receive e-Books periodically throughout the program. e-Books are available in hard copy at 50% of the recommended retail price. Contact us for pricing details.

Entrance Requirements

This Engineering Institute of Technology advanced diploma is an accelerated, practical, work-oriented program. It is designed for engineers and technicians who have some background in the field. This includes those who have technical or ‘trade’ qualifications who want to move to the next career step, those with substantial relevant work experience who need to formalise and enhance their achievements, and those with higher level qualifications in a related field who wish to develop specialist knowledge. Practical work experience in related areas of engineering would help enormously. It would not be suitable for a student with no relevant work experience. We will review your enrolment application and may recommend pre-program studies if required.

Advanced Diploma Preparation Program

If you are unsure if you have a strong enough grasp of the fundamental knowledge required for this program, or you simply want to refresh your skills and experience e-learning in a shorter program, we recommend that you consider the EIT’s engineering studies preparation program. This intensive 4-month program covers the fundamentals of engineering maths, physics and chemistry. Please ask your advisor for the brochure. If you don’t currently have an existing qualification and/or experience, please contact us for advice. Most important, however, is a determination to persist and complete this program.

On completion of this program, 50% of the program fees can be used as a credit towards your fee for an EIT Advanced Diploma program.

Hardware and Software Requirements

All you need in order to join the webinars once registered for the program is an adequate internet connection, PC, speakers and a microphone. The software package and setup details will be sent to you prior to the program.

We are Flexible with your Commitments

We recognise that personal circumstances can make it difficult to complete the program in the time available. We will be flexible about the time you require to complete the program. You can “pause and restart” by joining a subsequent intake (a rejoining fee may apply). We will allow up to 3 years from your original start date to complete the program.

You can withdraw from the program at any time and receive a Statement of Attainment for the topics you have completed. However, completion of all 72 topics will earn you the EIT Advanced Diploma of Industrial Data Communications, Networking and IT.
What Our Students Have to Say

What made you choose an EIT program(s)?

“Good reputation, had attended good full-time programs previously.” Worley Parsons

“Program facilitator CV, ...reputation, e-learning flexibility.” SMK, New Zealand

“Content tends to practical and targeted.” MIPAC, Australia

“Non-vendor specific training and lower program costs with online training capabilities.” Worley Parsons

“The content of the program and the way the program was broken down were the key factors.” GEA Group

“I can do those programs at my own free time which made it more convenient for me.” Iluka, Australia

“Content was applicable to my job and industry. Taught by industry experts not academics. E-room delivery mode. Accreditation in various nations.” Sanofi Pasteur, Australia

“Because it is specialist, and so many available programs.” Kacst, Saudi Arabia

“Covered all my criteria and gave me recognised qualifications on completion.” Netafirm

“I took a previous program, IDC [associated organisation] is professional.” Cat Group

“I have done other programs with IDC [associated organisation] and was happy with the service provided.” GHD

“Had completed programs previously. Good content.” Woodside

“I understood from friends that it is good quality.” Rio Tinto

“Better choice of topic.” Rockwell RA

“Believed to be good quality based on previous training programs I have done in person.” BHP Billiton, South Africa

“It was referred to me by a colleague and I have attended seminars run by IDC before. The program that I am currently enrolled in also had all the outcomes I was looking for to further my career.” Rio Tinto

“The program content was relevant to my work environment and practical.” Alcoa

“I have done a few IDC programs in the past and found them to be very good and delivered by people with practical knowledge of the subjects.” Kalgold

“It provides good online program delivery including its quality support structures.” OneSteel

“Program interest and content.” ABB, Australia

“The fact I could do it online and it was in line with furthering my knowledge for work.” CAED, Australia

“It ticked all the boxes ... quality, suitability, depth, length.” Powerco, New Zealand

“Better choice of topic.” Rockwell RA

“Program was visible and relevant.” Schneider Electric, UK

“Convenience.” Rio Tinto

“To be perfectly honest with the small amount of research on various programs I did the programs are generally the most relevant to my area of work. That’s not to say they are perfect but they seem to be superior to others readily available in this part of the world.” WEL Networks, New Zealand

“Program content seems practical and applicable. I already have a BSc where the focus is on the theory.” BHP Billiton, South Africa

“Industry recognition and recommendation by colleagues.” Rio Tinto

“Seemed the most convenient option, and it was!” CPIT, New Zealand

“Program content ease of study option.” Nestle, South Africa

“The content of the program made up my mind.” Transportadora de gas del Norte, Argentina

“Their programs are standard and program material as well as lecture are okay.” Shell, UK

“Its international recognition with body endorsing certification. Easy to attend lessons after work hours. Easy way of program payment.” Kinyara Sugar Ltd, Uganda

“The most practical and technical offerings by the most qualified instructors for distance learning.” Encana Natural Gas

“On line references, price, and various time frames available to sit in on the class. Also, one more important item was being able to converse with the instructor and class instead of working totally on my own.” Mitchell Technical Institute

“Program content. Accreditation of the training institution. Cost.” MODEC

“Offer the correct program, timing and affordable cost.” Folec, Brunei

“Possibly the most recognised online institution within my industry.” DRA, South Africa
Frequently Asked Questions

What are the advantages of studying online?
We know that many potential students have part or full-time employment as well as family commitments, so finding the time to study a classroom-based program is not always possible. Many students also have geographical, travel and time limitations and do not have an accessible institution or training provider. We have taken this into consideration and developed an affordable, flexible, online approach to training. This means that you can study from anywhere, with minimum downtime from work – but still have the necessary interactive learning experience. The software we use does not require very fast internet connection or a sophisticated computer. A basic connection and hardware are sufficient.

What are the fees?
The EIT provides distance education to students located almost anywhere in the world – it is one of the very few truly global training institutes. Program fees are paid in a currency that is determined by the student’s location. A full list of fees in a currency appropriate for every country would be too complex list here and, with today’s exchange rate fluctuations, difficult to maintain.

To find out the fees for your location, contact us at enquiries@eit.edu.au.

What do I need?
A PC, an adequate Internet connection, speakers and a microphone. A headset is recommended. The necessary software and program materials are provided by us.

Doesn’t it get boring? How can an e-Learning program be interactive?
Boredom can be a real risk in any form of learning; however, we use an interactive approach to our e-Learning – with live sessions (instead of recordings) for most presentations. The webinar software allows everyone to interact and involves participants in group work; including hands-on exercises with simulation software and remote laboratories where possible. You can communicate with text messages, or live VoIP speech, or can even draw on the whiteboard during the sessions. This all helps to keep you motivated and interested.

What do live webinars involve?
These are live, interactive sessions over the Internet. You will join the instructor and other participants from around the world in an online ‘Virtual classroom’ where you are able to watch a presentation, and communicate with the instructor and other students via audio, text messaging or drawing on the whiteboard. Each webinar is between 60 and 90 minutes in duration and the sessions are scheduled at 2 or 3 different times during the presentation day. This allows you to select the session which is most convenient.

What if I cannot join or I miss a live webinar?
Webinars are recorded and available to students upon request. One requirement of the program is that you join at least 70% of the live sessions. The live webinars offer the opportunity to interact with the presenter and other participants from around the globe - an essential yet enjoyable part of the learning process.

Circumstances such as on-site work can make attendance difficult at times. These situations need to be clearly communicated with your e-learning coordinator. Feedback from the recordings may be required and assessment submission maintained.

When will the sessions take place? When will I receive a webinar schedule?
The webinar schedule is not put together until after registrations close. The reason for this is that the program is promoted globally and we often have participants from several time zones. When you enrol you will receive a questionnaire which will help us determine your availability. When all questionnaires are returned we create a schedule which will endeavour to meet everyone’s requirements.

Each webinar runs 2 or 3 times during each presentation day and we try our best to ensure that at least one session falls into your requested time frames. This is not always possible, however, due to the range of locations of both presenters and students. If you are unable to attend the webinars scheduled, we do have some options available. Contact the EIT for more details.

Can I complete the program in less time?
Our programs actually require ‘attendance’ and participation at the live webinars. The interaction which takes place is an important part of the learning process. Our experience has shown that the interactive classes work exceptionally well and students are far more likely to stay motivated, enjoy the program, and complete the program successfully. See also ‘What if I cannot join or I miss a live webinar?’

In addition, accelerating the program would be quite onerous for most students.

How much time do I need? How long is the program?
The program reading and assignments may consume anywhere from 6 to 10 hours per week. This will vary depending on the program subject matter and your existing knowledge.

The EIT does not use a traditional semester-based system, which means that you can complete the qualification faster without long breaks. Each advanced diploma program is delivered over an intensive 18 months. We do break for about 4 weeks per year for traditional festive seasons.
International Expert Speaker Faculty

Your team of professional presenters and facilitators are drawn from experts in their field. They will work closely with you for the duration of the program. Please note: Lecturers are subject to change. Students will be notified in the event new lecturers join the faculty.

GUEST SPEAKER

Richard E. Morley

Richard E. Morley, best known as the father of the Programmable Logic Controller (PLC), is a leading visionary in the field of advanced technological developments. Mr. Morley (Dick) is a member on the Board of Directors of various companies across the United States and has worked in high tech industries since the beginning of solid-state electronics.

He is currently Chairman of the Board of NCMS (National Center for Manufacturing Sciences) and has a proven track record in the founding of successful high-tech companies for where he provides initial product concept and a continuing technological presence. He is a nationally recognized expert in the field of computer design, artificial intelligence, automation and is an authority on the factory of the future. Mr. Morley is an engineer, consultant and inventor. His inventions include the PLC (Programmable Logic Controller), which now stands in the Smithsonian Institute. He holds more than twenty United States and foreign patents.

Mr. Morley is well known as a lecturer, has written extensively for such publications as Manufacturing Systems magazine and Manufacturing Automation magazine. He has published many works of his own. His latest book, ‘Out of the Barn’, was published in October 2002 and another book, ‘The Technology Machine’, was published in September 1999. Mr Morley founded the angel investment group; the Breakfast Club. He is currently an active member with this group of investors participating in more than 100 startup companies in the New Hampshire area. He was the former Director of Advanced Technologies for Gould, Inc. He is a Gould Fellow of Science and Engineering, a Fellow of SME, Bios LP and ICS.

In addition, he was awarded the 1990 Entrepreneur of the Year by Inc. magazine, Merrill Lynch and Ernst and Young. He is a 1991 recipient of The Franklin Institute’s Howard N. Potts Medal, and holds the Prometheus Medal placing him into the Automation Hall of Fame. International IEN ranked him 3rd in the “Top 100 Most Significant Industrial Products of the 20th Century” for his work with the PLC. In October 1999, ISA (Instrumentation, Systems and Automation Society) honored him with the “Life Achievement Award” and Fortune magazine awarded him their “Heroes of Manufacturing Award” in March 2000.

Recognised as one of the giants in the field by the Engineering Society of Detroit, he has extensive experience in high-tech consulting and is involved in new product development at the highest management levels. Currently he works out of his barn in New Hampshire where he and his wife have been home to more than two dozen foster children.

ACADEMIC CONSULTANT

Steve Mackay  PhD, BSc(Elec.Eng), BSc(Hons), MBA, MMR, CP Eng , FIE(Aust) - Dean of Engineering, EIT

Steve has worked in engineering throughout Australia, Europe, Africa and North America for the past 30 years. He has presented numerous industrial automation and industrial data communications programs worldwide to over 18,000 engineers and technicians, and has a particular interest in practical and leading edge aspects of marketing, business and engineering practice.

He is a fellow of Engineers Australia and the technical director and founder of IDC Technologies, a growing engineering training and publishing firm which has been operating from offices throughout the world since 1992. He has also acted as the author or editor of over 30 engineering textbooks sold throughout the world. He feels that all engineering businesses need to think globally and keep experimenting with new approaches. He is currently leading a team of two design engineers and four programmers in creating a new video conferencing software package with remote labs which he believes will make a marked impact on engineering training and education.

PROGRAMME LEADER AND LECTURER

John Lawrence  B.Sc (Hons) M.Sc  B.Com (Hons)

In today’s hyped up world, one is hesitant to describe anyone as ‘outstanding’, but John Lawrence has distinguished himself over the last 15 years with excellent program reviews.

John has 20 years of experience as a project and departmental manager for a multi-national oil company, focusing on designing and managing the infrastructure of the telecommunications, data communications and IT systems. In the past 5 years, John has worked extensively for a number of multi-national clients, managing projects including facilities management, budgeting and financial forecasting.

When John is not consulting or lecturing, he enjoys increasing his own skills by reading and writing about state-of-the-art technology topics and how to optimise Return On Investment (ROI) for the overall IT infrastructure. John is a dedicated professional who has trained engineers and technicians throughout the world.
International Expert Speaker Faculty

LECTURER

Dr Rodney Jacobs  
NH Dip, M Dip Tech, BA (Hons), D Tech  
Senior Instrumentation Engineer

Rodney has over 20 years experience in the gold mining industry, underground as well as specialising in Metallurgical operations in the Gold Plants. He has worked predominately in the instrumentation; process control and automation field, and is responsible for hardware and software designs associated with instrumentation. His areas of special interest include PLCs, SCADA systems, process control and programming. Having spent many years on the shop-floor, Rodney has built up a vast amount of hands-on practical experience, and is a past recipient of the N & Z award, which is one of the most prestigious awards, for South Africans in the field of instrumentation.

Rodney is currently active as a Consulting Engineer in the field of instrumentation, both to the mining industry as well as to other general engineering companies, which require specialised solutions. He has also lectured in Electronics, Electrical Engineering and Digital Systems, at a university level. Rodney feels that people are the most important asset of any organisation and has a qualification in Psychology to complement his Engineering knowledge and experience.

Rodney has presented numerous IDC workshops in the United States, England, Ireland, Scotland, Bahrain, United Arab Emirates, Iran, Vietnam, Australia, New Zealand, Malaysia and a great deal of sub-Saharan countries in Africa.

LECTURER

G. Vijayaraghavan  
B.E. (Hons) Electrical

Vijay’s experience is primarily in the field of industrial power distribution systems. He has contributed to the design, engineering, commissioning and operation of HV distribution equipment in steel industry for over 15 years which includes outdoor switchyards, indoor MV switchgear and distribution substations. He has also been trained in the operation of large captive power plants forming part of integrated steel plant systems. He has worked as the head of testing of protection and HV equipment in a large 4 MTPA integrated steel plant.

He has also served as the head of the electrical and instrumentation group for over 2 decades in a firm of consulting engineers handling several large international projects, including the power distribution systems of large metallurgical industries and the integrated power generation plants, the captive thermal power generation unit of an Aluminium smelting and refining complex and Tonnage oxygen plants associated with steel manufacturing, among several others.

Vijay has been associated with IDC/EIT for over 10 years and has designed and presented training programs on various topics related to electrical power engineering. Vijay is a popular instructor his students often seek his advice in analysing and solving technical problems at work, sometimes long after the completion of the program itself.

LECTURER

Larry Browning  
BSc

Larry’s exposure to data communications began 15 years ago whilst he was taken under the wings of an experienced naval radio communications engineer; Rob DeVaack – whom ran the Perth branch of RF Industries Australia. Whilst absorbing what he could about the inner workings of radio antennas and modems... something would pique his interest; that at the time was barely in the colloquial vernacular. That something was the World Wide Web.

The web would have to wait however as Larry still needed to feed himself and his family! Approximately 5 years later Larry would cross paths with Boston Technology – the sister company to IDC Technologies. They needed some new blood to promote their line of industrial communications hardware, industrial PCs, and Ethernet products. Over the next 7 years Larry would become IDC’s IT manager, consultant for program practicals and kits, and continued to keep things ticking over with Boston Technology. The websites for both companies would end up being maintained by Larry – first out of an interest to tinker, but eventually out of necessity. Thus Larry took himself to university and decided that a career in web design was ultimately his long term passion. Along his academic journey Larry also trained himself to use Linux operating systems. This led him to developing a 2-day program on the subject and then presented it throughout Australia to excellent reviews.

Early in 2007 Larry met with a very ambitious entrepreneur – Brian Gillett. Sitting around Larry’s coffee table – they meted out designs to build an online business directory to rival that of Sensis’ Yellow Pages. Larry developed; singlehandedly for the first 2 years – http://bloo.com.au. Larry lives in Perth, Western Australia and balances consulting and training for IDC & EIT with his primary role as Information Systems manager at bloo.
International Expert Speaker Faculty

LECTURER

Edwin Wright  B.Sc B.E. (Hons) (Elec) MIPENZ

Edwin has over 35 years of practical experience in the planning, design, construction and operation of telecommunications systems, data networks, SCADA and Ethernet systems. He has also been involved as Project Manager on many projects and has a passion for technology topics.

Edwin has published numerous papers, and consulted widely on Ethernet, data communications and telecommunications issues in the USA, Canada, UK, Australia and New Zealand. Over the past eleven years more than 15,000 engineers and technicians have attended his workshops worldwide.

You will benefit from his tremendous knowledge and enthusiasm for the topics and his entertaining instructing style. When not working in the communications world he relaxes by reading and writing on technology issues at his beachside home.

LECTURER

Deon Reynders  Pr Eng. BSEE MBA

Senior Engineer

Deon has had over 25 years experience in automation, data communications [with a focus on industrial applications] and Ethernet TCP/IP networks. He has specific experience in Systems Engineering, Project Management and software and hardware development. Currently he is retained as a consultant to industry in the TCP/IP, industrial Ethernet networking, OPC and the industrial data communications areas. Deon is a practical, hands-on person and a highly entertaining speaker. He has received excellent reviews from his thousands of program participants in regions ranging from Europe, North America, Africa and Australia. He takes great pride in demystifying difficult concepts and presents them in a simple-to-understand manner. He is a passionate, enthusiastic and knowledgeable professional engineer.

LECTURER

Brian Hobby  BE (Electrical and Electronic) Auckland University

Brian has 20+ years of engineering experience. He thinks in systems and the connections between them as a result of his time as a Naval Weapons Electrical Engineering Officer.

As a design, commissioning and project engineer with Rio Tinto Alcan he oversaw the first application of devicenet in an aluminium smelting environment and assisted with piloting fully automated anode changing.

More recently he has been involved with collecting data from process using the OSIsoft historian and using their toolset for analysis. His experience with networking goes back to becoming the accidental sysadmin for a Novell Netware system in the early 1990’s and has been a part of his roles ever since.

Currently he works for Griffith University as a Technical Lead/Project Manager where he is assisting in collecting and analysing data in support of their sustainability initiatives.

LECTURER

Danie Stoop  Pr. Eng. ECSA 960178 M Eng Electronics (Cum Laude, PU for CHE 2000)

Danie was born in South Africa in 1964 and obtained the B. Eng. Electrical and Electronic degree from the former Potchefstroom University for Christian Higher Education [PU for CHE] in 1987.

After lecturing at the PU for CHE’s School for Electrical and Electronic Engineering for three years he began his own electronic consultancy business, Dantron, in 1992. In 1997 he won the University’s VERKA competition for best lecturer in the Faculty of Engineering. During that time he conducted research in TCP/IP based digital communications for which he obtained a Masters degree Cum Laude in 1999. He also pioneered a programmable logic laboratory, sponsored by Xilinx from the USA.

Danie’s design experience includes many facets of embedded systems and -programming for applications such as protocol converters between TCP/IP and industrial protocols, MODBUS/TCP/IP interfaces for soft-PLC’s, CAN-bus, I2C, smart telephone systems, ISDN and computer data communications.

Danie was also awarded for the most innovative contribution towards the Northwest University’s management systems in 2011 and currently holds the position as Head of Electronic Services at the university, where he gained extensive experience in specifying, installing and maintaining corporate-wide electronic systems.
LECTURER

Michael McCabe

As an EIT lecturer Michael has that essential mix of experience from industry and in training and education. He has more than 20 years of involvement in telecommunications, variously as a systems integration engineer, telecommunications consultant and as a technical trainer in telecoms and IT. He has worked with a range of communication technologies including those fixed networks which fall under Access, Transport and Core. In mobile networks he has experience with a wide array of technologies within Access and Core such as GSM, GPRS, UMTS and WLAN.

Over the years Michael’s knowledge has been garnered from several large corporations based in Southern Africa; ESKOM Enterprises South Africa, Siemens Telecommunications and Ericsson Education. It is the latter, together with MTN South Africa, which have engaged him in training projects throughout the continent of Africa. His broad understanding of telecommunication systems, his experience with relevant technologies and knowledge of the structures and methods of management have made him a most able and impressive instructor.

A sample of the comments from past clients illustrate the calibre of Michael’s capability; “His knowledge of the subject and his preparedness was just fantastic”, “The trainer was well versed in the subject matter” and “The delivery of the content was good and straight to the point. He is confident, enthusiastic and knows his stuff”.

LECTURER

Mark Shuttleworth  GradDipCommSys, BA, ACEEng, CIVTAE

Mark has over 25 years experience in electronics and communications engineering. Mark began his career gaining broad and extensive industrial experience in various electronic communication companies and departments such as GPT Telecommunications, Unilab Telecommunications and Stanilite electronics, where he has worked on the development, installation and commissioning of cellular/trunk UHF radio and two way radio HF, VHF and UHF systems for the defence, emergency services and commercial clients. Mark then started a training career as an engineering lecturer in TAFE teaching fundamental electrical units to more advanced units in wireless communications, industrial data communications and engineering mathematics. He has also designed and built RF electronic devices for training purposes and written many training manuals for both students and commercial clients.

Mark is now the principal lecturer of engineering at Central Institute of Technology in Western Australia and has also worked as a consultant communications systems engineer for the past few years working on various small to large projects. One large project that Mark worked on was as an independent technical consultant with the Western Australian Police which included consulting with the police radio division and Motorola on the installation and commissioning procedures of a multi-million dollar digital trunk radio system.
Module 1: Industrial Data Communications

Duration: 5 WEEKS

You Will Learn How To:

1. Examine and discuss the reference models for data communication systems
2. Examine and discuss the basics of wired serial communication
3. Examine and discuss the basics of protocols
4. Examine and discuss the basics of computer networks
5. Examine and discuss basic troubleshooting techniques

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

This module provides a foundation in data communications by first introducing basic principles, and then following up with an in-depth treatment of the structure and importance of layered protocol design. It provides coverage of the RS-232, RS-422, and RS-485 standards, and outlines how they play a central role in industrial protocols. This module will equip you with the basic understanding necessary to analyze, specify and debug data communications and networking systems in the instrumentation and control environment. The module is designed to benefit people involved in specifying, commissioning and debugging data communications and networking systems for instrumentation and control, but who have little previous experience in this area.

THE PROGRAM

Topic 1.1
REFERENCE MODELS
- The 7-layer OSI model
- The 4-layer TCP/IP model
- Data communications technologies vs. the OSI and TCP/IP stacks
- TIA, IEEE, ISA and other communication standards

Topic 1.2
WIRED SERIAL COMMUNICATION STANDARDS
- RS-232
- RS-422
- RS-485

Topic 1.3
INTRODUCTION TO PROTOCOLS
- Definition of a protocol
- Protocols vs. the 4 and 7-layer reference models
- Asynchronous character-based (ASCII) protocols (DF-1)
- Asynchronous hexadecimal protocols (Modbus Serial)
- Synchronous hexadecimal protocols (HDLC)

Topic 1.4
INTRODUCTION TO NETWORKS
- LANs, MANs, WANs
- Physical and logical topologies
- Medium Access Control methods
- Interconnecting devices

Topic 1.5
TROUBLESHOOTING METHODOLOGY
- Common symptoms, problems and solutions
- Quick identification of likely causes
- Overall basic steps
- Communications issues
- Earthing, grounding, shielding and noise
Module 2: Industrial Ethernet

Duration: 4 WEEKS

You Will Learn How To:

1. Examine and discuss the attributes of 10 Mbps half-duplex (CSMA/CD) Ethernet
2. Examine and discuss the attributes of Fast (100 Mbps) and Gigabit (1000 Mbps) Ethernet
3. Examine and discuss Ethernet cabling and connectors
4. Examine and discuss the concept of Industrial Ethernet

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

Ethernet has become the de facto choice for industrial networking worldwide. While the basic structure of Ethernet has not changed significantly over the years, the faster technologies such as Fast Ethernet and Gigabit Ethernet have increased the complexity and choices available in planning and designing these systems. As Ethernet has become more complex, a number of misconceptions have arisen as to how Ethernet functions and how the system should be optimally configured. This module addresses these issues in a clear and practical manner, thus enabling you to apply the technology quickly and effectively in your next project.

THE PROGRAM

Topic 2.1
INTRODUCTION TO ETHERNET
- Legacy (10 Mbps) Ethernet variants
- Supported topologies and media
- CSMA/CD
- MAC addresses
- Bluebook (V2) and IEEE 802.3 frames

Topic 2.2
FASTER ETHERNET VARIANTS
- 100 Mbps, 1 Gbps and 10 Gbps Ethernet variants
- Auto-negotiation and full-duplex
- Ethernet hubs, switches, routers, gateways and terminal servers

Topic 2.3
ETHERNET CABLEING AND CONNECTORS
- Copper (coaxial, UTP, STP)
- Fiber
- Cabling and connectors
- Structured cabling

Topic 2.4
INDUSTRIAL ETHERNET
- Redundant topologies
- Deterministic operation
- Hardened devices
- Intrinsic Safety (IEC Ex.ia)
- Power over Ethernet (PoE)
- Packaging

You Will Learn How To:

1. Examine and discuss the attributes of 10 Mbps half-duplex (CSMA/CD) Ethernet
2. Examine and discuss the attributes of Fast (100 Mbps) and Gigabit (1000 Mbps) Ethernet
3. Examine and discuss Ethernet cabling and connectors
4. Examine and discuss the concept of Industrial Ethernet

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.
Module 3: Wireless Communication Systems

Duration: 6 WEEKS

You Will Learn How To:
1. Examine and discuss the basics of wireless communication
2. Design a point-to-point terrestrial wireless link
3. Examine and discuss the design and operation of Wireless LANs
4. Examine and discuss the design and operation of Wireless Mesh Networks
5. Examine and discuss the design and operation of telemetry systems
6. Examine and discuss the design and operation of RFID systems

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview
The make-up and structure of telecommunications networks has changed dramatically in the past few years. These changes impact on the equipment you purchase, the services you use, the providers you can choose, and the means of transporting the data. This module will be of particular benefit to those who want to apply the latest and most effective telecommunications technology immediately. Your company may already be looking at operating its own telecommunications system or may be looking at using the systems available on the market. With the vast array of equipment and systems and technology now available, you need the necessary knowledge to make the best decisions. We believe this module will allow you to achieve your objectives in learning about, and then applying, the fundamentals of telecommunications to your next project.

THE PROGRAM

Topic 3.1
WIRELESS COMMUNICATION BASICS
- Regulatory and standards bodies
- Frequency bands and allocation
- Modulation techniques
- Spread Spectrum
- Antenna types

Topic 3.2
POINT-TO-POINT TERRESTRIAL WIRELESS LINKS
- Path profile
- Fresnel zone and antenna heights
- Link budget
- Effective Isotropically Radiated Power
- Fade Margin and Availability
- Antenna selection

Topic 3.3
WIRELESS LANs
- WLAN concepts
- IEEE 802.11 [a/b/g/n]
- Industrial WLANs

Topic 3.4
WIRELESS MESH NETWORKS
- Mesh basics
- IEEE 802.11 mesh
- IEEE 802.14.5 mesh
- ISA SP100.11a mesh
- Applications

Topic 3.5
TELEMETRY
- Transceiver components
- Auxiliary components
- Transducers
- Applications

Topic 3.6
RADIO FREQUENCY IDENTIFICATION SYSTEMS
- RFID fundamentals
- RFID tags
- Tag packaging formats
- RFID system components
### Module 4: Field Buses

**Duration: 4 WEEKS**

**You Will Learn How To:**
1. Examine and discuss the attributes of selected field buses
2. Perform bus length calculations for selected field buses
3. Configure and troubleshoot selected field buses
4. Examine and discuss Ethernet and wireless technology in Field Buses

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

**Overview**

There are a multitude of so-called ‘field buses’, described by various standards such as IEC 61158 and IEC 62026. These buses include, but are by no means limited to, HART, DeviceNet, PROFIBUS and FOUNDATION Fieldbus. These systems are becoming widely accepted at the field and instrumentation level, replacing the traditional analog-based approaches. In addition, these systems are rapidly being augmented by Ethernet and wireless technologies. This module will give you an overview of the state-of-the-art in field bus technology.

**THE PROGRAM**

**Topic 4.1**

**DEVICENET**
- Media
- Supported topologies
- Physical Layer implementation
- Message structure
- Medium Access Control
- Basic troubleshooting

**Topic 4.2**

**PROFIBUS DP/PA**
- Media
- Supported topologies
- Physical Layer implementation
- Message structure
- Medium Access Control
- Basic troubleshooting

**Topic 4.3**

**FOUNDATION FIELDBUS H1**
- Media
- Supported topologies
- Physical Layer implementation
- Message structure
- Medium Access Control
- Basic troubleshooting

**Topic 4.4**

**ETHERNET AND WIRELESS TECHNOLOGY IN FIELD BUSES**
- Ethernet/IP
- PROFINET
- FOUNDATION Fieldbus HSE
- Wireless PROFIBUS
- Wireless DeviceNet
- High-speed Ethernet field buses (EtherCat, EPL)
Module 5: Fiber Optics

Duration: 2 WEEKS

You Will Learn How To:

1. Examine and discuss the basics of fiber optic transmission
2. Examine and discuss the basics of fiber optic testing

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

This module covers the fundamentals of fiber optic systems and their individual components. It deals with fiber types, cable construction, connectors, splices and optical sources and detectors. It also gives an overview of the design and testing of fiber optic systems. The module discusses some of the practical issues in component selection and system design, and also covers the design of a basic fiber optic link.

THE PROGRAM

Topic 5.1
OVERVIEW OF FIBER OPTIC TRANSMISSION
- Fundamental principles of fiber optic transmission
- Types of fibers
- Connectors and splices
- Optical sources and detectors
- Design parameters

Topic 5.2
TESTING OF FIBER OPTIC SYSTEMS
- Concepts of optical measurement
- Continuity and insertion loss testing
- Optical Time Domain Reflectometry (OTDR)
Module 6: DNP3 and IEC 60870-5 for SCADA

Duration: 3 WEEKS

You Will Learn How To:
1. Examine and discuss the fundamentals of DNP3
2. Examine and discuss advanced DNP3 concepts
3. Simulate and troubleshoot DNP3
4. Examine and discuss the fundamentals of IEC 60870-5

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview
This module covers the essentials of DNP3 and IEC 60870-5 SCADA protocols. A solid review is done on the DNP3 protocol where the features, message structure, practical benefits, interoperability and applications are discussed. An overview of the IEC 60870-5 protocols is also given. This module is intended to be product-independent, but examples will be taken from existing products to ensure that all aspects of the protocols are covered.

THE PROGRAM

Topic 6.1
DNP3 FUNDAMENTALS
- Introduction to DNP3 and IEC 60870-5 protocols
- OSI Layer implementation
- Message structure
- Physical and Data Link layer implementation
- Transport and Application layer implementation

Topic 6.2
ADVANCED CONSIDERATIONS OF DNP3
- DNP3 Object Library
- DNP3 packet decoding
- Subset definitions and conformance testing
- Interoperability between DNP3 devices
- Polling and communication options
- Implementation in terms of software and hardware
- DNP3 over TCP/IP and UDP/IP

Topic 6.3
IEC 60870-5 FUNDAMENTALS
- IEC60870-5 standards
- Message formats
- Physical and Data Link layer implementation
- Application layer implementation
- ASDU structure
- IEC 60870-5-104 over networks
- Differences between DNP3 and IEC 60870-5

THE PROGRAM

Display
Display
Display
Printer

THE PROGRAM

Operator station

Radio modem

RS-232

Remote Server Task

Input/Output Server Task

THE PROGRAM

Operator station

Radio modem

RS-232

Remote Server Task

Input/Output Server Task

THE PROGRAM

Operator station

Radio modem

RS-232

Remote Server Task

Input/Output Server Task

THE PROGRAM

Operator station

Radio modem

RS-232

Remote Server Task

Input/Output Server Task
Module 7: TCP/IP and VoIP

Duration: 5 WEEKS

You Will Learn How To:
1. Examine and discuss the TCP/IP Internet Layer protocols
2. Examine and discuss the TCP/IP Host-to-Host Layer protocols
3. Examine and discuss the TCP/IP Application Layer protocols
4. Examine and discuss the basics of VoIP

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

The Internet has made a substantial impact on the way we do business, as well as on the plant and factory environment. A superb suite of protocols inherited from the Internet is TCP/IP, which is used by many present-day automation and process control systems, SCADA systems and PLCs. Even low-level instruments are using TCP/IP and Ethernet to transfer information. TCP/IP and Ethernet are truly open standards, available to competing manufacturers and providing the user with a common standard at low cost.

Another significant development is ‘convergence’. Over the past decade, networking and telephony technologies have converged to such an extent that one can transmit data, voice, fax and video over the same IP network. This module also addresses the basics of, and protocols used for, Voice over IP or 'VoIP'.

THE PROGRAM

Topic 7.1
INTERNET LAYER PROTOCOLS: IP
- IPv4 addressing
- IPv4 packets and header structure
- Subnet Mask and Default Gateway
- Private IPv4 addresses, NAT and IP Masquerading
- IPv6 addressing
- IPv6 header structure

Topic 7.2
INTERNET LAYER PROTOCOLS: OTHER
- ARP
- RARP
- ICMP
- IGMP
- Routing Protocols
- Utilities

Topic 7.3
HOST-TO-HOST LAYER PROTOCOLS
- TCP ports and sockets
- TCP functions and header structure
- TCP connections
- UDP function and header structure
- Port Forwarding

Topic 7.4
APPLICATION LAYER PROTOCOLS
- FTP
- TFTP
- TELNET
- SNMP
- BOOTP
- DHCP
- DNS
- HTTP
- RPC

Topic 7.5
VOIP
- Codecs
- RTP and RTCP
- H.323
- MGCP and SIP
- QoS issues
Module 8: Routers and Switches for Industry

Duration: 4 WEEKS

You Will Learn How To:
1. Examine and discuss the basics of switches
2. Examine and discuss the basics of routers
3. Examine and discuss the basics of routing protocols
4. Examine and discuss advanced routing concepts

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

Switches and routers are the kingpins of modern LANs. Routers are arguably the most complex and the most important component of networks, although managed switches are also becoming increasingly more complex. This module covers the basics of switches as well as routers (and routing protocols) and the basic rules to follow in building internetworks. If you are using any form of communication system or modern PLC/SCADA systems, this will give you the essential tools in designing and maintaining your networks.

THE PROGRAM

Topic 8.1

SWITCHES
- Mechanics of bridging
- Mechanics of switching
- Layer 2 vs. Layer 3 switches
- Managed vs. unmanaged switches
- Spanning Tree algorithms
- VLANs

Topic 8.2

ROUTERS
- Fundamentals of IP routing
- Static vs. dynamic routing
- Routing tables and metrics
- Routing protocols
- Autonomous Systems
- Interior vs. exterior gateway protocols
- Border routers

Topic 8.3

ROUTING PROTOCOLS
- Distance-vector vs. link-state algorithms
- Routing Information Protocol (RIP)
- Interior Gateway Protocol (IGRP)
- Enhanced Interior Gateway Protocol (EIGRP)
- Open Shortest Path First (OSPF)

Topic 8.4

ADVANCED ROUTING CONCEPTS
- Multi Protocol Label Switching (MPLS)
- IP Security (IPSec)
- Access Control Lists (ACLs)
- Dealing with dissimilar protocols
- Redundancy issues
Module 9: Modbus

Duration: 2 WEEKS

You Will Learn How To:

1. Examine and discuss Modbus Serial
2. Examine and discuss Modbus TCP

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

Modbus is one of the few industrial messaging protocols recognized by the Internet (TCP/IP) world, and has been assigned ‘well-known’ TCP port number 502. It has one of the largest installed bases world-wide, with more than 7 million installed nodes. The Modbus/TCP profile has been accepted by the International Electrotechnical Commission (IEC) as a Publicly Available Specification (IEC PAS 62030), which made it eligible to become part of subsequent editions of the International Standards IEC 61158 and IEC 61784-2. It enjoys the status of an open standard, available to everyone, hence its popularity. Whilst detractors will say Modbus lacks some of the refinements of the newer offerings on the market, there is no doubt that it is one of the most popular standards available in the Industrial world.

THE PROGRAM

Topic 9.1 Modbus Serial
- Protocol stack
- Modbus Function Codes and addressing schemes
- Master-slave (client-server) interaction
- Frame structure
- Modbus RTU vs. Modbus ASCII
- Error messages

Topic 9.2 Modbus Over TCP/IP
- Protocol stack
- MBAP header
- Frame structure
- TCP/IP encapsulation
Module 10: OPC

Duration: 3 WEEKS

You Will Learn How To:
1. Examine and discuss the basics of OPC
2. Examine and discuss the OPC specifications
3. Examine and discuss practical OPC implementation issues

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

OPC has come a long way in making the engineer’s dream of plug-and-play compatibility in automation engineering achievable. OPC is an industry-wide standard that breaks this ‘proprietary lock’ by allowing open connectivity based on the principles adapted from widely-accepted and applied Microsoft Windows integration standards. OPC capabilities have been demonstrated in many practical applications and it is now an established approach for SCADA manufacturers. If you are serious about reducing your costs of installing and maintaining your automation systems, you need to use OPC. If you have only briefly heard about OPC and want to come to grips with its tremendous power, then this module will give you the necessary tools.

THE PROGRAM

Topic 10.1
INTRODUCTION TO OPC
- OPC overview and concepts
- DDE
- DCOM infrastructure
- (.NET) infrastructure

Topic 10.2
OPC SPECIFICATIONS
- OPC specification structure
- Legacy specifications
  - OPC Common
  - Data Access (DA)
  - Alarms and Events (AE)
  - Historical Data Access (HDA)
  - Security
  - Batch
  - XMLDA
- The new Unified Architecture (UA)

Topic 10.3
PRACTICAL IMPLEMENTATION
- OPC bridging
- Firewall settings
- DCOM configuration
- Redundancy
- Tunneling

Where is the data?
Many clients may connect to many servers from many vendors on many nodes.
Module 11: PLCs

Duration: 4 WEEKS

You Will Learn How To:
1. Examine and discuss PLC hardware and installation
2. Demonstrate the ability to develop PLC programs

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

This module presents practical, up-to-date information on the application of PLCs in plant automation and process control. It is suitable for individuals who have little or no exposure to PLCs, but wish to become involved in some or all aspects of PLC installation. It aims to give practical advice from experts in the field to assist you in correctly planning, programming and installing PLCs with a shorter learning curve and more confidence.

THE PROGRAM

Topic 11.1
INTRODUCTION TO PLCs
- Processors, power supplies and programming devices
- Memory systems
- Digital I/O
- Analog I/O
- Special function I/O and serial communications interfacing

Topic 11.2
(A) LADDER LOGIC FOR SIMPLE DIGITAL FUNCTIONS
- Basic rules
- The concept of the 'scan' and how to apply it
- Contact 'normal' states
- Positive and negative logic
- Basic Boolean functions

(B) USING REGISTERS (WORDS)
- Number systems
- Types of register data
- Timers and counters
- Bit shift and rotate
- Table functions

Topic 11.3
(A) GOOD PROGRAMMING HABITS
- Keeping track of addresses and data used
- Program maintenance
- Practical methods to improve quality

(B) GOOD INSTALLATION PRACTICE
- Hardware location
- Wiring practice
- Reducing noise and interference

Topic 11.4
(A) SAFETY PROGRAMMABLE SYSTEMS
- Why regular PLCs should not be used for safety functions
- Safety certification
- Certified programming systems

(B) SYSTEM CHECKOUT AND TESTING
- Development and verification of code
- Testing procedures
- Emulating process responses
Module 12: E-Manufacturing, MES and Supply Chain Management

Duration: 1 WEEK

You Will Learn How To:

1. Examine and discuss MES system hierarchies and components
2. Examine and discuss design models, concepts and standards for MES systems

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

Supply Chain Management involves the optimization of the way in which a company plans the production of goods or services, procures raw materials from various suppliers, manufactures the goods or services, delivers it to customers, and handles returns. Manufacturing Execution Systems (MESs) provide up-to-the-minute mission-critical information about production activities across the factory and supply chain via communications networks (e.g. LANs), resulting in the optimization of activities throughout all aspects of the manufacturing process. MESs accomplish this task by guiding, initiating, responding to, and reporting on plant activities in real time, by using current and accurate data. This rapid response to changing conditions, together with a focus on reducing non-profitable activities, lead to more efficient plant operations and processes. E-Manufacturing encompasses both these systems and more. This module will investigate these systems as well as the standards and concepts that drive them.

THE PROGRAM

Topic 12.1

(A) SYSTEM HIERARCHIES AND COMPONENTS
- Evolution of various hierarchical models
- Components of each hierarchical level and their functions
- Interaction between hierarchical levels
- Functions of PLC, SCADA, MES, ERP and SCM solutions

(B) DESIGN MODELS, CONCEPTS AND STANDARDS FOR E-MANUFACTURING SYSTEMS
- Models, concepts and theories used in the design of E-Manufacturing solutions
- Standards and regulations influencing system functionality design
- Basic assumptions behind the models and standards
- Content of SCOR, REPAC, IEC 61131-3, ISA 88 and ISA 95
Module 13: **IEC 61131-3 for PLC Programming**

**Duration: 3 WEEKS**

**You Will Learn How To:**

1. Examine and discuss the IEC 61131 concepts and common elements
2. Develop programs by using IEC 61131-3

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

**Overview**

PLCs have become part of the backbone of industrial automation. The International Electrotechnical Commission (IEC) has developed a standard set of programming languages for PLCs. The success of these languages can be measured by the large number of major PLC manufacturers who are developing products that are 61131-3 compliant. IEC 61131-3 is becoming the standard of choice in many industries, and will boost productivity and enhance software quality. If you master the subject today your programming knowledge will be applicable across brands well into the future.

This knowledge is vital for personal career development.

**THE PROGRAM**

**Topic 13.1**
**IEC 61131-3 CONCEPTS**
- I/O interfaces
- Communication interfaces
- System interfaces
- Software model main elements
- Mapping software model to real systems

**Topic 13.2**
**COMMON ELEMENTS**
- Character sets
- Identifiers
- Data types
- Variables
- Functions
- Program usage and instances
- Resources and tasks
- Configuration

**Topic 13.3**
**PROGRAMMING LANGUAGES**
- Sequential function chart
- Instruction list
- Ladder diagrams
- Function Block diagrams
- Structured text
Module 14: SCADA and Data Acquisition

Duration: 4 WEEKS

You Will Learn How To:

1. Examine and discuss the basics of SCADA hardware
2. Examine and discuss the basics of SCADA software
3. Examine and discuss the SCADA communications infrastructure
4. Examine and discuss PC-based data acquisition

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

SCADA has traditionally provided a window into the process of a plant or the gathering of data from devices in the field. Now, however, the focus is on integrating this process data into the actual business and using it in real time. The emphasis is on using open standards such as IEC 60870, DNP3 and TCP/IP, as well as ‘off-the-shelf’ hardware and software to keep the costs down.

For stand-alone applications, personal computers have become a popular and affordable platform from which to perform data acquisition and control for a variety of industrial and scientific applications. Data acquisition with a PC enables one to log and control a variety of real world signals such as pressure, flow and temperature and to interface to various standalone instruments. This module will also equip you with the knowledge and expertise to configure an efficient and effective data acquisition and control system using a PC and standalone instruments.

THE PROGRAM

Topic 14.1
SCADA SYSTEMS HARDWARE
- SCADA systems architecture
- RTUs
- Servers
- Historians
- HMI hardware
- Redundancy issues

Topic 14.2
SCADA SYSTEMS SOFTWARE
- SCADA software packages
- SCADA system configuration
- HMI configuration
- Alarm management
- History and trending

Topic 14.3
COMMUNICATIONS INFRASTRUCTURE
- RTU communications protocols
- Cable technologies
- WAN technologies
- LAN technologies
- Wireless technologies

Topic 14.4
DATA ACQUISITION
- Data acquisition devices
- Sensors
- Sensor buses
- Signal conditioning
- Digital I/O
- Analog I/O
Module 15: Industrial Network Security

Duration: 3 WEEKS

You Will Learn How To:

1. Examine and discuss security threats to networks
2. Examine and discuss encryption and authentication methods
3. Examine and discuss the implementation of security measures

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

This module will give you a fundamental understanding of effective security measures in industrial networking and data communications. It also highlights the key issues associated with security in industrial communications networks. It will assist managers, system operators and industrial data communications specialists in setting up secure systems. On completion of this module you will have developed a practical insight into how to achieve optimum industrial network security.

THE PROGRAM

Topic 15.1
INTRODUCTION
- Threats
- Security policies
- Security audits
- Advisory services
- Hardware security

Topic 15.2
ENCRYPTION AND AUTHENTICATION
- Symmetric encryption
- Asymmetric encryption
- Authentication basics
- RADIUS authentication
- Digital certificates
- Passwords
- Smart cards
- Tokens
- Biometrics

Topic 15.3
SECURITY MEASURES
- Proxies and firewalls
- Intrusion Detection Systems
- Virtual Private Networks
- Security for wireless systems
- Specific guidelines for SCADA systems
Module 16: HTML/Web design

Duration: 3 WEEKS

You Will Learn How To:
1. Apply basic HTML and CSS
2. Demonstrate how to add content to web pages
3. Create a website

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview
This module will give you a broad overview of website design. These days, almost everyone has a webpage or site to advertise anything from their thoughts to their products. You will learn how to set up a hosting account, create and upload a web page, and then modify it online or offline as and when required.

THE PROGRAM

Topic 16.1
HTML AND CSS
- The ‘Big Picture’: HTML, CSS, JavaScript, XML, PHP, ASP
- HTML syntax
- HTML basics
- CSS syntax
- CSS insertion methods
- CSS Id and class
- CSS styling (background, fonts etc.)

Topic 16.2
PAGE CONTENT
- Adding graphics and images
- Adding audio
- Adding video
- Adding interactivity using JavaScript
- Adding opt-in boxes for auto-responders

Topic 16.3
WEB HOSTING
- Shared vs. dedicated online hosting alternatives
- cPanel
- Domain Name registration and DNS setup
- FTP
- Editors
- Website creation software
- WordPress
Module 17: Algorithm Design

Duration: 1 WEEK

You Will Learn How To:
1. Examine and discuss algorithm design techniques

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

Algorithm design, an important step in software development, is used to ensure that a program is correct and efficient at solving its presented problem. This module will detail algorithm design techniques and a clear delineation of analysis methods and data structures. This will give you a conceptual understanding and strengthen your skills in algorithmic problem solving and simple design.

THE PROGRAM

Topic 17.1

DESIGN TECHNIQUES
• Importance of pseudocode
• Performance tuning
• Popular search algorithms
• Arrays, hashes and lists
• Linked lists and variants
• Sequential, object-oriented and functional architectures
Module 18: C++ Programming

You Will Learn How To:
1. Set up a C++ development environment
2. Write simple programs in C++
3. Compile, run and debug C++ programs

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview
C++ is a general-purpose programming language. It was developed by Bjarne Stroustrup at Bell Labs (around 1979) as an enhancement to the C programming language. It is arguably one of the most popular programming languages ever created, and is widely used in the software industry. Applications include systems software, application software, device drivers, embedded software, high-performance server and client applications, and entertainment software such as video games. Several groups provide both free and proprietary C++ compiler software, including the GNU Project, Microsoft, Intel and Borland. This module is aimed at providing newcomers to the programming world a proper grounding in C++ and its development tools.

THE PROGRAM

Topic 18.1
C++ PROGRAMMING PART 1
- Introduction to C++
- IF statements
- Loops in C++
- Functions
- Switch case
- Pointers
- Structures

Topic 18.2
C++ PROGRAMMING PART 2
- Arrays
- Strings
- File I/O
- Typecasting
- Classes
- Inline functions
- Command line arguments

Topic 18.3
C++ PROGRAMMING PART 3
- Linked lists
- Recursion
- Variable argument lists
- Binary trees
- Inheritance
- Initialization lists
- C++ Class Design

Topic 18.4
C++ PROGRAMMING PART 4
- Enumerated types
- Formatted output in C++
- Generating random numbers
- Using Modulus
- Templates in C++
- Templated functions
- The C Preprocessor
Module 19: SQL Databases

Duration: 3 WEEKS

You Will Learn How To:

1. Examine and discuss the fundamentals of SQL
2. Demonstrate the ability to modify table contents
3. Demonstrate the ability to construct nested queries

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

SQL forms the cornerstone of all relational database operations. The ability to write the SQL language is essential for those who develop database applications. This module provides a solid foundation of the SQL programming language that enables you to build, query and manipulate databases.

THE PROGRAM

Topic 19.1
INTRO TO SQL
- SQL as the cornerstone of all database activity
- Relevant ANSI/ISO standards
- Fundamental building blocks: tables, columns, primary keys and foreign keys
- Terminology

Topic 19.2
MODIFYING TABLE CONTENTS
- Adding table rows
- Changing row content
- Removing rows
- Writing single table queries
- Retrieving data
- Including columns and expressions in query results
- Restricting rows
- Sorting results
- Handling NULL values in expressions
- Avoiding NULL value pitfalls in filter conditions

Topic 19.3
CONSTRUCTING NESTED QUERIES
- Applying sub-queries in filter conditions
- Correlated vs. non-correlated sub-queries
- Embedding sub-queries in several levels
- Testing the existence of rows
- Single row vs. multi-row sub-queries
- Including sub-queries in expressions
- Placing sub-queries in the column list
- Creating complex expressions containing sub-queries
- Handling sub-queries that return no rows
Module 20: Windows Administration

Duration: 3 WEEKS

You Will Learn How To:

1. Examine and discuss the installation and configuration of Windows Server 2008 R2
2. Examine and discuss the services and features of Windows Server 2008 R2

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

Windows Server 2003 enables organizations to build robust and reliable enterprise infrastructures to manage and secure users, resources and network applications. This module provides the essential foundation for managing Windows Server 2003 systems. You will gain basic experience in evaluating, designing and managing a Windows Server 2003 environment.

THE PROGRAM

Topic 20.1
INSTALLATION, CONFIGURATION AND HYPER-V
- Introduction to R2
- Installation and configuration
- Scaling and migrating Virtual Machines (VMs)

Topic 20.2
DESKTOP SERVICES, FILE SERVICES AND ACTIVE DIRECTORY
- Remote Desktop Services and VDI
- Active Directory
- File Services

Topic 20.3
IIS, NETWORK POLICY, AND OTHER FEATURES
- IIS 7.5
- DirectAccess and Network Policy Server
- Other features and enhancements
You Will Learn How To:

1. Examine and discuss time management for projects
2. Examine and discuss cost and risk management for projects
3. Examine and discuss quality and earned value management

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

All the technical know-how in the world will not deliver a project successfully without proper project management skills. Unfortunately very few engineering professionals have any degree of formal project management training, which results in a great deal of personal stress as well as cost blow-outs and other woes. This module will focus on the critical project-related activities and show how these can be performed with software to lighten the project manager’s workload.

THE PROGRAM

Topic 21.1
TIME MANAGEMENT
- Work Breakdown Structures
- Precedence method of project network analysis
- PERT and Gantt charts
- Resource allocation, analysis and leveling
- Progress monitoring and reporting

Topic 21.2
COST AND RISK MANAGEMENT
- Cost estimating
- Forecast Final Cost
- Budgeting
- Financial and change control
- Risk management
- Risk analysis methods

Topic 21.3
QUALITY AND EARNED VALUE MANAGEMENT
- Quality concepts
- Project quality plan
- Earned Value Management (EVM) concept
- Budgeted vs. actual costs
- Cost and schedule variances
- Cost and schedule performance indices
- Estimating project costs to and at competition
Module 22: PC Hardware and Troubleshooting

Duration: 2 WEEKS

You Will Learn How To:

1. Examine and discuss PC hardware components
2. Demonstrate the ability to design, upgrade, diagnose and maintain systems

For the detailed assessment criteria of each learning outcome, please contact your EIT Learning Advisor or Program Coordinator.

Overview

This module is based on 'Upgrading and Repairing PC's, 20th Edition' by Scott Mueller. Besides being a best-selling book, this is one of the most comprehensive and complete PC hardware reference texts in the world today, due to its depth and quality of know-how. Due to the volume of material and the rapid changes occurring in the computer world, we will focus on acquiring 'meta knowledge' skills - i.e. knowing where to look for information when diagnosing problems.

The key objective of this module is to give you skills in maintaining, diagnosing and repairing PCs. After gaining an understanding of the PC architectures, there will be discussions on the BIOS, memory, hard disks, audio, video systems, Internet and LAN connectivity, and power supplies. The module will conclude with a review of PC diagnostics, testing and maintenance.

THE PROGRAM

Topic 22.1
PC HARDWARE
- CPUs
- Motherboards
- Buses
- BIOS
- Dynamic memory
- Static memory
- Multimedia hardware
- I/O interfaces
- Input devices
- Power supplies

Topic 22.2
(A) BUILDING AND UPGRADING SYSTEMS
- Assembly/disassembly
- Motherboard installation
- OS installation

(B) DIAGNOSTICS, TESTING AND MAINTENANCE
- Diagnostics software
- The hardware boot process (POST)
- Preventive maintenance
- Maintenance tools