



The IEEE

# Newsletter

PUBLICATION OF THE NORTH JERSEY SECTION OF THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

*NJ Signal Processing Chapter:*  
**Watermarking in the  
Real World: An  
Application to DVD**

On Thursday, February 17, 2000, the IEEE North Jersey Section Signal Processing Society Chapter will host a presentation on "Watermarking in the Real World: An Application to DVD." The speaker will be Dr. Ingemar J. Cox.

**About the Talk**

The prospect of consumer DVD recorders highlights the challenge of protecting copyrighted video content from piracy. Digital watermarking can be used as part of a copy protection. We describe the copy protection system currently under consideration for DVD. We will also highlight some implementation issues that are being addressed.

**About the Speaker**

Dr. Ingemar J. Cox received his BSc Degree from University College London and PhD from Oxford University. He was a member of the Technical Staff at AT&T Bell Labs at Murray Hill from 1984 until 1989 where his research interests were focused on mobile robots. In 1989 he joined NEC Research Institute in Princeton, NJ as a Senior Research Scientist in the computer science division. At NEC, his research shifted to problems in computer vision and he was responsible for creating the computer vision group at NECI. He has worked on problems to do with stereo and motion correspondence and multimedia issues of image database retrieval and watermarking. From 1997-1999, he served as Chief Technical Officer of Signafy, Inc, a subsidiary of NEC responsible for the commercialization of watermarking. In 1999, he returned to NEC Research Institute as a research Fellow.

He is a Senior Member of the IEEE and on the editorial board of the Int. Journal of Autonomous Robots. He is the co-editor of two books, *Autonomous Robots Vehicles* and *Partitioning Data Sets: With Applications to Psychology, Computer Vision and Target Tracking*.

**All Welcome!**

You do not have to be an IEEE member to attend. Light refreshments will be served at 4:45 PM.

**Time:** 5:00 PM, Thursday, February 17, 2000.

**Place:** New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at [www.njit.edu](http://www.njit.edu).

**Information:** Dr. Yun-Qing Shi, (973) 596-3501, [shi@njit.edu](mailto:shi@njit.edu) (NJIT) or Dr. Alfredo Tan, (201) 692-2324, [tan@mailbox.fdu.edu](mailto:tan@mailbox.fdu.edu) (Fairleigh Dickinson University).

## Advance to Senior Member Grade

This leap year, you have an extra day to apply for Senior Member Grade. It takes ten years experience. A Bachelors degree counts for three of those years and Masters and Doctorates each count for one more year. You don't have to be an IEEE member for ten years. There is no difference in cost for the different grades. To get information and an application, give your name and mailing address to: Don Weinstein, Kulite Semiconductor, One Willow Tree Road, Leonia, NJ 07605-2239, (201) 461-0900 Ext 234, mornings, FAX (201) 461-0990, email: [don@kulite.com](mailto:don@kulite.com).

## New Online Master of Science in Electrical Engineering

Fairleigh Dickinson University, Teaneck, NJ, is now offering its highly respected Master of Science in Electrical Engineering (M.S.E.E.) program over the Internet. The new online M.S.E.E. has the same high academic standards as the on-campus program that has a 30-year tradition of academic excellence. The online program can be completed entirely over the Internet. There is no campus residency requirement. Students can access the materials on the FDU web site anytime, from anyplace in the world, with a 486 or better (16 MB RAM) computer, reasonably fast modem, the latest web browser, and (of course) an internet connection. They would submit their assignments by mail, email or fax. Ongoing communication and guidance are provided via an electronic forum or conventional means throughout the program.

Fairleigh Dickinson University is accredited by the Commission of Higher Education of the Middle States Association of Colleges and Schools. Demo courses and information on admission requirements, schedule, tuition, fees and courses are available at

<http://www.fdu.edu/wcb/>

(that's wcb, not web).

For additional information, please contact Dr. Alfredo Tan, Director - School of Engineering and Engineering Technology, Fairleigh Dickinson University, Teaneck, NJ 07666. Phone: (201) 692-2347, Fax: (201) 692-2130, email: [tan@mailbox.fdu.edu](mailto:tan@mailbox.fdu.edu).

**FEBRUARY 2000**

# February 2000

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### NEWSLETTER STAFF

Editor .....Keith Saracinello  
Business Manager .....Theresa Saracinello

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### IEEE NJ SECTION HOME PAGE

<http://www-ec.njit.edu/~ieeenj/>

### IEEE NJ SECTION NEWSLETTER HOME PAGE

<http://www-ec.njit.edu/~ieeenj/NEWSLETTER.html>

### REPORT ADDRESS CHANGES TO:

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### SECTION OFFICERS

Chairman .....Alan Stolpen  
[a.stolpen@ieee.org](mailto:a.stolpen@ieee.org), (973) 822-1300, ext. 2416  
Vice-Chairman-1 .....Dr. Nirwan Ansari  
(973) 596-3670  
Vice-Chairman-2 .....Rodney Cole  
[rgcole@ieee.org](mailto:rgcole@ieee.org) (973) 299-9022 Ext. 2257  
Treasurer .....Milton Korn  
[miltonkorn@aol.com](mailto:miltonkorn@aol.com) (973) 365-2757  
Secretary .....Wayne Owens  
[wowens@crestron.com](mailto:wowens@crestron.com) (201) 767-3400, ext. 226

### Members-at-Large:

Bhanu Chivakula ([b.chivakula@computer.org](mailto:b.chivakula@computer.org))  
Durga Misra ([dmisra@megahertz.njit.edu](mailto:dmisra@megahertz.njit.edu))  
Richard Tax ([rtax@bellatlantic.net](mailto:rtax@bellatlantic.net))

*The North Jersey Section Executive Committee usually meets the first Wednesday (except holidays and December) of each month at 7:00 PM. Meetings are open to all members. For information on meeting agenda contact Secretary Wayne Owens at (201) 767-3400, ext. 226, [wowens@crestron.com](mailto:wowens@crestron.com).*

NY/NJ/LI EMBS:

## Tele-Rehabilitation:

### Prospects and Progress

On February 2nd, 2000, the North Jersey, New York, and Long Island Chapters of the Engineering in Medicine and Biology Society (EMBS) of the IEEE together with the New York Academy of Medicine's Sections on Biomedical Engineering and Physical Medicine and Rehabilitation will host a program on "Tele-Rehabilitation: Prospects and Progress." The speaker will be Dr. Michael Rosen.

### About the Talk

Tele-rehabilitation is the application of telehealth tools and techniques to deliver rehabilitation services to both practitioners and patients in remote clinics and homes. In this presentation, Dr. Rosen will discuss the concepts, distinctions, terminology, and technologies that define the new field of Tele-rehabilitation. He will provide examples of the clinical services that can be provided via tele-rehabilitation, including: (1) Counseling, (2) Training, (3) Assessment and monitoring of function and health status, (4) Delivery of therapeutic interventions. Dr. Rosen will also outline the technical, regulatory and economic obstacles that need to be overcome to fully realize the potential of tele-rehabilitation. A demonstration of current methods for real-time video interaction and sharing of data over telecommunication lines, with and without benefit of computers, will be given. Attendees will have an opportunity to interact with individuals remote from New York City via these links. Finally, the speaker will present a sample of the research and development projects now underway at the Rehabilitation Engineering Research Center on Tele-rehabilitation at the Catholic University of America, National Rehabilitation Hospital and Sister Kenny Institute in Washington, DC, sponsored by the Department of Education National Institute on Disability and Rehabilitation Research.

### About the Speaker

Michael J. Rosen, PhD, is the Director of the Rehabilitation Engineering Service at the Catholic University of America, National Rehabilitation Hospital and Sister Kenny Institute in Washington DC. He received his undergraduate education at Brown University, and did his graduate work at Northwestern University, completing his PhD in Electrical Engineering, with a specialty in Biomedical Engineering in 1972. In 1975 he joined the Mechanical Engineering Department at MIT. He has specialized in understanding the mechanisms of disability and applying engineering

science and design to reduce the functional deficits which result. His areas of particular interest are communication technologies for motorically non-vocal individuals, mechanics and orthotic modification of pathological tremors, design of assistive products, and tele-rehabilitation. Dr. Rosen has held teaching positions at MIT, the University of Tennessee in Memphis, where he was an Associate Professor in the Department of Biomedical Engineering and Orthopedics, and at the Catholic University of America. He has collaborated with physiatrists, neurologists, orthopedists, and allied health professionals in his teaching and research efforts, emphasizing a friendly team approach to solving patients' problems.

**Time:** 7:15 PM Registration (no charge), 7:30 PM Program, Wednesday, February 2, 2000.

**Place:** New York Academy of Medicine, Fifth Avenue at 103rd Street, Manhattan. TRAVEL HINTS: If coming by car, there may be limited free parking in NYAM enclosed lot at 2 East 103rd Street. By subway, take #6 to 96th St (Lex. Ave line). Walk to 5th Avenue, walk to 103rd St. [a better route than the wavy path through a housing project on 103rd St.]

**Information:** Joel H. Levitt (212) 479-7805 (24 hr voice mail).

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OF NORTHERN NJ**

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## North Jersey Section Activities February 2000

**Feb. 2**–“NJ Section Executive Committee Meeting” - 6:00 PM, NJIT, Room 202, ECE Building, Newark, NJ. Wayne Owens at (201) 767-3400 ext. 226 or wowens@crestron.com.

**Feb. 2**–“Carbon Nanotube Arrays & Non-lithographic Nanofabrication for Future Electronics” – EDS/C&S Chapters, 7:00 PM, NJIT, Room 202, ECE Building, Newark, NJ. Dr. Richard Snyder (973) 492-1207 (RS Microwave), Dr. Durga Misra or Dr Edip Niver (973) 596-3542 (NJIT).

**Feb. 2**–“Tele-Rehabilitation: Prospects and Progress”– NY/NJ/LI EMBS, 7:15 PM Registration, 7:30 PM Program, New York Academy of Medicine, Fifth Avenue at 103rd Street, NY, NY. Joel H. Levitt (212) 479-7805 (24 hr voice mail).

**Feb. 17**–“Watermarking in the Real World: An Application to DVD” - NJ Signal Processing Chapter, 5:00 PM (refreshments at 4:45 PM), NJIT, 202 ECE Center, Newark, NJ. Dr. Yun-Qing Shi (973) 596-3501 (NJIT) or Dr. Alfredo Tan (201) 692-2324 tan@mailbox.fdu.edu (Fairleigh Dickinson University).

**Feb. 24**–“What's It Worth? - Putting a Price on Consulting Services” - NJ Consultants' Network, 7:30 PM, KDI Triangle, 60 S. Jefferson Road, Whippany, NJ. Robert Walker (973) 728-4500 or www.TechnologyOnTap.com.

### Upcoming Meetings

**Mar. 1**–“NJ Section Executive Committee Meeting” – 7:00 PM, ITT, 100 Kingsland Road, Clifton, NJ. Wayne Owens at (201) 767-3400 ext. 226 or wowens@crestron.com.

**Mar. 13 - May 15**–“Object Oriented C++ Programming” – North Jersey Section, Monday Evenings, 10 sessions, 6:30-9:00 PM, GEC-Marconi, 164 Totowa Road, Wayne, NJ. Gabe Silberman at 732-463-6824 (silberman@ieee.org) or Bhanu Chivakula 973-751-4879 (b.chivakula@computer.org).

**Mar. 15 - Apr. 19**–“Object Oriented Design” – North Jersey Section, Wednesday Evenings, 5 sessions, 6:30-9:00 PM, GEC-Marconi, 164 Totowa Road, Wayne, NJ. Gabe Silberman at 732-463-6824 (silberman@ieee.org) or Bhanu Chivakula 973-751-4879 (b.chivakula@computer.org).

**Mar. 17**–“Induction Motor Drives & Applications Seminar” – NJ IAS/PES Chapters, 9:00 AM to 4:00 PM, Smiths Industries, 7-9 Vreeland Road, Florham Park, NJ. R. Vittal Rebbapragada (609) 720-3209 or via e-mail at r.rebbapragada@ieee.org.

**May 7**–“NJ Section Awards Reception”–3:00 to 6:00 PM at the Birchwood Manor, 111 North Jefferson Road, Whippany, NJ. Anne Giedlinski (973) 377-3175.

**Members and Non-Members Welcome**

**PLEASE POST**

NJ EDS, C&S Chapters:

## Carbon Nanotube Arrays & Non-lithographic Nanofabrication for Future Electronics

On February 2nd, 2000, the IEEE NJ Section Electron Devices, and Circuits and Systems Chapters together with the New Jersey Institute of Technology will host a talk on "Carbon Nanotube Arrays & Non-lithographic Nanofabrication for Future Electronics." The speaker will be Jimmy Xu.

### About the Talk

The celebrated microelectronics technology has known a one-dimensional path: Miniaturization. It has now come to a crossroads. Looking down the road to nanoelectronics, one sees exponentially increasing cost and diminishing return with billion dollar IC fab costs doubling every generation. The high cost is on the one hand squeezing out all but the largest players, and on the other slowing down innovation from within. Troubles at the physical foundation of the technology are as concerning, if not more so. The wiring challenge and the power dissipation crisis are only going to get worse with each further step of miniaturization. These problems are rooted in the much hyped Digital (i.e. von Neumann's binary and serial computing) paradigm which has remained unchanged for decades. The time has come to look for alternative paths; a view shared by many. Alternatives do exist, both on the fabrication front, as attested by the recent successes of "natural" approaches in nanofabrication, and on the architecture front, as advocated by von Neumann himself in his later years and many others. In this talk, the speaker will use a recent success in fabricating highly ordered arrays of carbon nanotubes with the best uniformity yet reported as an example of the capabilities enabled a non-lithographic nanofabrication technique being developed. Also highlighted will be additional examples of efforts on two fronts "in search of alternative paths" to future evolution of microelectronics:

1. Non-lithographic fabrication of highly-ordered arrays of nanotubes, nanowires and nanodots; their fundamental properties and device applications;
2. The Prospects of extracting computational functions from the collective behavior of large and highly ordered arrays of simple nanoelements.

### About the Speaker

Currently a professor of Engineering and Physics at Brown University, Jimmy Xu, was Director of the Nortel Institute for Telecommunications and the Nortel Chair Professor in Emerging Technologies at the University of Toronto. He received a number of awards including the 1995 Steacie Prize of Canada, and served as editor of IEEE Transactions on Electron Devices and on a number of national and international committees and boards, including the National Research Council of Canada's advisory board. He has published over 120 papers in refereed journals and over 80 conference papers; been granted 15 patents; given numerous seminars, colloquia, invited talks; and supervised many PhD and Master's students, seven of whom received national or international awards/prizes for their research accomplishments.

### All Welcome!

You do not have to be a member of the IEEE to attend.

**Time:** 7:00 PM, Wednesday, February 2, 2000. Free buffet will be starting at 6:15 PM.

**Place:** New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at [www.njit.edu](http://www.njit.edu).

**Information:** Dr. Richard Snyder (973) 492-1207 (RS Microwave), Dr. Durga Misra or Dr Edip Niver (973) 596-3542 (NJIT).

*NJ Consultants' Network:*

## What's It Worth? - Putting a Price on Consulting Services

On Thursday, February 24, 2000, the IEEE Consultants' Network of Northern NJ will host "What's It Worth? - Putting a Price on Consulting Services", a panel discussion and presentation with member experts of the Northern NJ Consultants' Network.

### About the Talk

Appearing regularly like a reoccurring nightmare, the most prevalent dilemma among independent technology consultants, both novices and veteran consultants alike, is deciding how much to charge their next client for their services. Putting a price tag on yourself can be a daunting and uncertain process. A panel of consultants from the Northern NJ Consultants' Network will discuss the various methods that they have used in their practices. Among the topics to be covered:

- ◆ Flat Fee Pricing vs. Time & Materials pricing
- ◆ The Contract Engineer vs. the Expert Consultant
- ◆ Pricing from The Client's Perspective
- ◆ Negotiation Factor: To Haggle or Not to Haggle

### About the Panelists

Jim Boyd, Principal of XL Research Inc., designs microcontroller-based products for consumer and industrial applications. Since 1978, XL has delivered designs for arcade games, cordless telephones, experimental solar homes, high-speed printing machinery, fire alarm systems and a control system for a US prison. Mr. Boyd is also Consulting Editor of the "Ideas For Design" feature of Electronic Design magazine.

George Hacken, PhD, Principal of Altman Research Corp., is a published researcher with over 35 years of computer applications in science, algorithms, avionics, simulation, automation, finance and business applications. Mr. Hacken is conversant in classic and contemporary methodologies and maintains currency in relevant technologies, e.g. satellite communications, formal methods and parallel processing.

Eric Holme, Principal of MESA, Inc., supervises the installation, commissioning and maintenance of power plant electrical equipment. Mr. Holme has over 20 years experience preparing and pricing proposals. He maintains a database of prices for Fixed-Fee and Time & Materials work. Mr. Holmes prepares and presents technical papers on topics related to power plant operation and maintenance issues.

### About the Consultants' Network

The IEEE Consultants' Network of Northern NJ was founded in 1992 to encourage and promote the use of independent technical consultants by business and industry.

### All Welcome!

You do not have to be a member of the IEEE or of the Consultants' Network to attend. Networking after the meeting is encouraged.

**Time:** 7:30PM, Thursday, February 24, 2000.

**Place:** KDI Triangle, 60 S. Jefferson Road, Whippany, NJ.

**Information:** For directions and up-to-date meeting status, call Robert Walker (973) 728-4500 or visit our website at [www.TechnologyOnTap.com](http://www.TechnologyOnTap.com).

## North Jersey Y2K Student Presentation Contest!

The new Y2K student presentation contest is coming up!! The North Jersey Section will be holding a presentation contest scheduled for late-February or early-March of 2000. This contest has been held in years past and its overwhelming success in generating student participation and interest make it an fantastic event for up and coming engineers. This year's contest has also GROWN. Not only are the prizes (\$\$\$) bigger, but it will have graduate and undergrad categories.

The main focus of the presentation contest is to give students an opportunity to sharpen their communication skills, and help prepare for real life situations as practicing engineers and researchers. Additionally, the North Jersey Section contest provides an excellent chance for students to practice for the Region I Student Paper contest in the spring. This year's Region I Contest will be held at Norwich University in Northfield, Vermont on Saturday, April 8, 2000. All the details of their program can be found at

<http://www.norwich.edu/ieee/index.html>

The contest at the North Jersey Section level is also supplemented by awarding cash prizes to the three best presentations in both graduate and undergrad categories. All engineering students are encouraged to participate in submitting team or individual presentations on any project work RELATED to engineering. This LOCAL contest does NOT require students to write a full paper, just a slide-based presentation on technical or non-technical work is sufficient. Senior design projects, lab projects, personal engineering hobbies, engineering policy etc. are great topics to submit.

The details of contest RULES, JUDGING criteria, viable TOPICS for presentations, and ABSTRACT form will be same as last year. These all can be found on the SAC website along with the abstracts of the winners of the 1999 Presentation Contest.

This year's North Jersey Section Contest will be open to graduate and undergraduate students and first/second/third place prizes will be awarded in each category of \$100/\$75/\$50. New Jersey Institute of Technology will be hosting the event, the exact date and time will be announced at they become available. All participants MUST submit an abstract by filling in the form available at the SAC website

<http://menger.eecs.stevens-tech.edu/~apatel3/ieee.html>

to qualify as a contest participant. Any and all questions can be emailed to the contest organizer, Amit Patel - NNJ SAC, at [a.j.patel@ieee.org](mailto:a.j.patel@ieee.org) or call (973) 284-2708.

## Associate Members, Advance to Member Grade

To advance to Member grade, you just have to fill out a Membership Application form and attach a copy of your resume. You can get the form and a mailing envelope by contacting: Don Weinstein, Kulite Semiconductor, One Willow Tree Road, Leonia, NJ 07605-2239, (201) 461-0900 mornings, FAX (201) 461-0990, email: [don@kulite.com](mailto:don@kulite.com).

## Here's Your GOLDen Opportunity!

Have you graduated (from your first bachelors' degree) in the last ten years? Looking to make professional and personal connections in the North Jersey area? Want to learn more about how to make your IEEE membership work for you? Then let's get a GOLD (Graduates of the Last Decade) group rolling again. The North Jersey Section is searching for folks interested in GOLD activities. We are seeking a North Jersey GOLD Chair (don't worry-there's not that much to do, and seasoned help is available) along with some new committee members to assist. Anyone who has recently graduated is heartily encouraged to jump in! Chances are, that any leadership and project planning responsibility you have at work will pale in comparison to the opportunities that await around IEEE.

Other GOLD Chapters around the world have been holding such \*fun\* (yes, that's a key word) events as: family barbecues, happy hours, and of course the more traditional IEEE format - meetings on topics ranging from "Managing Your Boss" and "Planning for Your Next Job" to "First Time Home Buying." Discussions often cover challenges faced by those fresh (or not so fresh) out of school, whether working in corporate America or self-employed. If anyone is interested, or even has any questions at all, contact Amy Galarowicz at email: [a.galarowicz@ieee.org](mailto:a.galarowicz@ieee.org) or work phone number (973) 765-0830.



# IEEE

*Networking the World™*

# INDUCTION MOTOR DRIVES & APPLICATION SEMINAR

The IEEE North Jersey Section Chapters of IAS/PES will host a one day Seminar on "Induction Motor Drives & Applications" on **March 17, 2000** at Smiths Industries in Florham Park, NJ. The seminar duration will be 9 AM to 4PM, with breaks for lunch & coffee. The seminar will cover the following topics:

- Fundamentals of Energy Conversion- Induction Motors
- Mathematical Modeling of Motors to Simulate Dynamics of its Performance
- Standards Governing the Selection & Application of Motors
- Application of Motors for Centrifugal Pumps, Fans, and Chillers
- Variable Speed Drive Applications
- Technical Issues Associated with Variable Speed Drive Applications
- Protection of Motors- IEEE Std. C37.96 perspective
- Digital Relays for Motor Protection.

The speakers for this Seminar have over 20 years of experience in the design, selection & application of the motors drawn from different organizations. The registration fee for this seminar prior to February 15<sup>th</sup> will be \$200 (non-IEEE members), \$150 (IEEE Members), and \$100 (Students with valid ID). Registrations after Feb 15<sup>th</sup> must include an additional late fee of \$25. The Seminar fee includes lunch, refreshments and handouts. Non-members joining IEEE within 30 days of the seminar will be rebated \$50 of the \$200 registration charge.

Date: March 17, 2000 (9am – 4pm)  
Location: Smiths Industries, 7-9 Vreeland Road, Florham Park, NJ 07932  
Information: contact R. Vittal Rebbapragada, PE at (609) 720-3209 or via e-mail at r.rebbapragada@ieee.org  
Registration: US mail to: K. Oexle  
11 Deerfield Rd  
Whippany, NJ 07981

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Registration: Induction Motor Drives & Application Seminar, 3/17/2000

Name \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

IEEE # \_\_\_\_\_ Student @ \_\_\_\_\_ Non IEEE \_\_\_\_\_

Payment Enclosed \$ \_\_\_\_\_ Add \$25 late registration after February 15th

# IEEE North Jersey Section Course Object Oriented C++ Programming

Monday Evenings, March 13 through May 15, 2000 - ten weekly classes  
(March 13, 20, 27, April 3, 10, 17, 24, May 1, 8, and 15)  
GEC-Marconi, 164 Totowa Road, Wayne, NJ  
(Checks should not be mailed to this address)

The North Jersey Section IEEE is offering an evening course entitled "Object-Oriented C++ Programming." The Object-Oriented concept is very widely used today in new design and programming work. Instead of focusing on functionality (what the programs do) it focuses on the natural objects comprising the problem and how they, and their capabilities, are modeled in the program.

C++ is the most widely used language today for object-oriented design and programming. But O-O programming is still programming, so the course will begin with the elements of procedural programs and using C++ as a better C language. It will then move on to Object-oriented programming. The course will cover concepts, implementation and practical aspects of using C++ code.

A knowledge of C programming is not necessary to take the course, but, because neither C nor C++ are elementary programming languages, a familiarity with foundation programming concepts will be very helpful.

## TOPICS

1. Review common elements of C and C++: punctuation and key words, variable naming, typing and scope, libraries, text strings, arrays, structures and pointers.
2. C++ procedural programs: conditionals and logical variables, looping and testing, subfunctions and arguments. Debugging.
3. Concept of Object-Orientation: objects and classes of objects, methods and messages, encapsulation and abstraction, overloading of functions and operators, inheritance and polymorphism.
4. C++ improvements to C: new commands and operators, comments, stream I/O. function prototypes, more explicit typing and linking.
5. C++ implementation of objects: what is a C++ object, data and method functions within an object, public, private and friend, static and dynamic objects, constructors and destructors.
6. Encapsulation and abstraction within C++ objects: references and aliases, scope control operator, 'this' object, overloading, functions, operators.
7. Inheritance and polymorphism among C++ objects: parent class or object, extending classes, redefining object data and methods, multiple inheritance.
8. C++ I/O streams: standard I/O, formatted I/O with manipulators, disk and device I/O.
9. C++ library classes and their use: characteristics of a good library class, conversion base classes, video base classes, window base classes, database base classes.
10. Overall program structure with C++ objects: how to lay out a C++ program, how to reuse classes in a program, how to test and evolve a C++ program, how to find errors and debug C++ object programs.
11. Other topics: object-oriented design methodologies, templates and the standard template library, namespaces and interactive program design. Object programs in the Windows environment. Evolution of C++. Commonality and differences with Java.

Class size will be limited to a maximum of 25 with a minimum of 15. Early registration is recommended. Phone reservations will NOT be accepted. Reservations accepted after March 1<sup>st</sup> will require a late fee of \$25. No reservations will be accepted after March 6<sup>th</sup>.

**WHERE:** GEC-Marconi, 164 Totowa Road, Wayne, NJ. (Checks **should not** be mailed to this address)

**WHEN:** 10 Sessions, Mondays, March 13 through May 15, 2000, 6:30-9:00 PM.

**COST:** With text book only: IEEE members \$295; Non-IEEE members \$395.

**CONTACT:** Gabe Silberman at 732-463-6824 (silberman@ieee.org) or Bhanu Chivakula 973-751-4879 (b.chivakula@computer.org)

## REGISTRATION: OBJECT-ORIENTED C++ PROGRAMMING

To: Mr. Naz Simonelli, 68 Woodmont Drive, Randolph, NJ 07869-3740 (Checks should be mailed to this address)

Name: / Mr. / Mrs. / Miss / Ms. / \_\_\_\_\_

Non-member

email address 

IEEE Member Member #: \_\_\_\_\_ Member of \_\_\_\_\_ technical society

Employer: \_\_\_\_\_

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Home Address: \_\_\_\_\_

Business (day) telephone #: \_\_\_\_\_ Home telephone #: \_\_\_\_\_

Please enclose required fee payable to: **North Jersey Section IEEE**

Registration status will be mailed after March 6, 2000. Phone inquiries concerning registration will NOT be honored. In general, the effective date of the application corresponds to the date when BOTH a fully completed application & payment are received.

Tuition receipt will be mailed only if this box is checked

Signature: \_\_\_\_\_

# IEEE North Jersey Section Course Object Oriented Design

Wednesday Evenings, March 15 through April 19, 2000 - five weekly classes

(March 15, 22, 29, April 12, and 19 - NO class on April 5th)

GEC-Marconi, 164 Totowa Road, Wayne, NJ

(Checks should not be mailed to this address)

The IEEE is offering an evening course entitled Object-Oriented Design. As Object-Oriented programming has become more important, Object-Oriented design has also emerged as a new way to conceptualize computer programs. The creation and dissemination of the Unified Modeling Language, as a skeleton for all phases of Object-Orientation, has aided this. This is a course in Object-Oriented design using UML. It covers software requirements, design and application, but it is not a programming course. It may be of interest to Software Project Managers, customers and programmers who want to learn the latest techniques of Object-Orientation using Unified Modeling Language. There will be five weekly lectures.

Upon completion of this course, the student will be able to:

- ◆ Use "Use Cases" and "Contracts" to capture the customer expectations for a system
- ◆ Use "Structure Diagrams" and "Class Diagrams" to define the classes and objects that make up the essence of the system
- ◆ Use "Sequence Diagrams" and "Collaboration Diagrams" to capture the flow of operations within the system
- ◆ Define and create various levels of simulations in order to test the validity of the system design and operation

## COURSE TOPICS

1. Introduction and background: The Software Development Cycle: requirements, design, and implementation. Comparison of techniques.
2. Object-Oriented Analysis: Comparison to natural language (English). Objects and their classes, Attributes of objects, Methods used by objects. General concept of "Encapsulation". Representations of objects etc. Exercise on defining objects.
3. Relationships within Objects: Other characteristics within objects: birth, death, multiplicity. Scope: public and private, Names of objects (subjects/references). General concept of "Abstraction". Representations of relationships within classes. Exercise on relationships.
4. Relationships among Objects: Real world relationships. Inheritance: base and derived classes. General concept of "Inheritance". Friends. Containers and iterators. Messages vs. methods. Automatic routing of messages. General concept of "Polymorphism". Representations of relationships among classes. E-R diagrams. Neatening up relationships: promotion, segregation. Exercise on relationships among objects
5. Other Topics: Relationships in other dimensions. Memory: state transition diagrams. Timing: triggers & clocks. Step-by-step design techniques. Software tools to aid in design.

Class size will be limited to a maximum of 25 with a minimum of 15. Early registration is recommended. Phone reservations will NOT be accepted. Reservations accepted after March 1<sup>st</sup> will require a late fee of \$25. No reservations will be accepted after March 6<sup>th</sup>.

**WHERE:** GEC-Marconi, 164 Totowa Road, Wayne, NJ. (Checks **should not** be mailed to this address)

**WHEN:** 5 Sessions, Wednesday - March 15 through April 19, 2000, 6:30-9:00 PM.

**COST:** With text book only: IEEE members \$200; Non-IEEE members \$225.

**CONTACT:** Gabe Silberman at 732-463-6824 (silberman@ieee.org) or Bhanu Chivakula 973-751-4879 (b.chivakula@computer.org)

## REGISTRATION: OBJECT-ORIENTED DESIGN

To: Mr. Naz Simonelli, 68 Woodmont Drive, Randolph, NJ 07869-3740 (Checks should be mailed to this address)

Name: / Mr. / Mrs. / Miss / Ms. / \_\_\_\_\_

Non-member

☒ email address ☒

IEEE Member Member #: \_\_\_\_\_ Member of \_\_\_\_\_ technical society

Employer: \_\_\_\_\_

Employer Address: \_\_\_\_\_

Home Address: \_\_\_\_\_

Business (day) telephone #: \_\_\_\_\_ Home telephone #: \_\_\_\_\_

Please enclose required fee payable to: **North Jersey Section IEEE**

Registration status will be mailed after March 6, 2000. Phone inquiries concerning registration will NOT be honored. In general, the effective date of the application corresponds to the date when BOTH a fully completed application & payment are received.

Tuition receipt will be mailed only if this box is checked

Signature: \_\_\_\_\_