



The IEEE

Newsletter

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

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North Jersey Section PACE: Plans And Goals For 1995

At the January 12, 1995 meeting of the North Jersey Section's Professional Activities Committee for Engineers, speaker Tom DeNigris will discuss plans and goals for 1995 with emphasis on E-Mail capabilities.

About The Talk

The past year was successful for the North Jersey Section, and in order to ensure even more success in 1995, hard work and careful planning is necessary. Some new volunteers have come forth, but more are needed. There are positions open in various society chapters as well as the Executive Committee. In the past, ELECTRO was the main source of income but this is no longer the case, so other sources of income must be found. A revitalized Student Activities program is needed.

Last, but far from least is the incredible world of E-Mail and the Internet. This is a resource right at our fingertips, but rarely used. Hopefully, 1995 will be the year that the members of the North Jersey Section take full advantage of this growing technology.

About The Speaker

Tom DeNigris is Chairman of the North Jersey Section for 1995. He has held various positions on the North Jersey Section Executive Committee, including Student Activities Chairman, Secretary and Vice Chairman of the Section. Holding a BSEE degree from the New Jersey Institute of Technology, Tom is currently a Senior Applications Engineer at Anadigics, Inc. in Warren, N.J.

Time: 7:30 PM, Thursday, January 12, 1995.

Place: JCP&L Co., 300 Madison Avenue and Punch Bowl Road, Morristown, N.J.

Information:

Robert Sinusas (201) 228-3941.

NJ MTT/AP Chapter: Electromagnetic Simulation

On January 17, 1995 the IEEE North Jersey Section MTT/AP Chapter will present "Accurate, Efficient And Inexpensive Electromagnetic Simulation For Planar And 3D Electronic Circuits." The speaker at this meeting will be Dr. Jian-X Zheng, President of Zeland Software, Inc., Fremont, CA.

About The Talk

Electromagnetic tools are essential for the design of high frequency structures including MMIC, RF circuits, antennas and high speed digital circuit packaging. Dr. Zheng will first discuss the basic theorem and algorithm inside the IE3D Electromagnetic Simulation and Optimization package. The main features of the IE3D simulators will be discussed. Several high frequency design examples will be demonstrated using IE3D package. Simulation results will be compared to measured data and other simulation results for MMIC circuits, HTS filters, edge-fed and probe-fed microstrip antennas and high speed electronic packages.

About The Speaker

Dr. Jian-X Zheng received his BS and MS in Electrical Engineering from Tsinghua University, Beijing, China in 1981 and 1986, respectively. He received his PhD. (EE) from the University of Colorado, in 1991. He joined EEsof and subsequently in 1992 started Zeland Software, Inc., specializing in electromagnetic simulation tools.

Time: 7:00 PM, Tuesday, January 17, 1995.

Place: NJIT, 2nd Floor Conference Room, 202 ECE Bldg., Newark, N.J.

Information: Chandra Gupta (201) 633-4469 (GEC-Marconi); Bill Schmidt (201) 492-0371.

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It is not necessary to inform the North Jersey Section when you change your mailing address. "The IEEE Newsletter" and other section mailings use a list provided by IEEE's national headquarters in New York. This means the Section has no need to maintain a mailing list or addressing plates. Section membership records are changed when Headquarters notifies us.

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Ted Byrne
Dr. Hiam Grebel
Dr. Chandra Gupta

The North Jersey Section Executive Committee usually meets the first Wednesday (except holidays and December) of each month at 7 PM. These meetings are open to all members. Information on meeting agenda is available from Dr. Fred Chichester (201) 744-7340.

No. NJ Consultants' Network: Talk On Internet

On January 26, 1995, the IEEE Consultants' Network of Northern NJ will feature a talk on the Internet. Following the talk several members will give presentations of their backgrounds and services.

Internet Presentation

Kathy Kenoly is Marketing manager of The Computer Insight Learning Center (CILC). She has 24 years of marketing experience in the retail business. CILC offers customized and prepared courses in applications development systems. Wyatt Kenoly has more than 30 years experience in the telecommunications field and is Network manager for the Wide Area Network of Bank of America and owner of HKC Consultants.

Together they will answer the following questions: What is it?; How can I use it to find clients?; Can I use it for research?; How do I get connected?

Consultants To Be Featured

The Featured Speaker series is being expanded to include Network consultants. Meant to introduce managers, owners, lawyers and others contemplating using consultants to the technical background, capabilities and services of the featured consultants.

David S. Greenspan specializes in documentation and training in communications, electronics and software. He received his BSEE from Washington University and MBA from Fairleigh Dickinson University. He presently operates Montville Data Services serving clients in northern and central New Jersey. He teaches courses at NJIT on technical documentation, and is a registered trainer for Frame Technology and offers basic, intermediate and advanced courses in FrameMaker.

Peter Schutz, P.E. is President of Schutz Engineering, one of the areas largest virtual corporations with a network of 200 to 300 technical specialists in all engineering disciplines. Schutz Engineering specializes in the design and limited manufacture of electro-mechanical equipment and more recently in special process instrumentation and control systems. Peter received his Bachelors degree in mechanical engineering from Lehigh University and a Masters degree from NJIT.

Howard D. Harper, President of H-Squared Engineering specializes in the mechanical design and packaging of Industrial and Medical Electro Mechanical Systems, Mechanism, Products and Devices. Howard has experience with concurrent engineering, Project management, and manufacturing process design as well as Safety and Regulatory Agency Compliance and much more.

About The Consultants' Network

The IEEE Consultants' Network of Northern NJ was founded in April 1992 to encourage and promote the use of independent technical consultants by business and industry. Meetings are held on the last Thursday of each month.

Time: 7:30 PM, Thursday, January 26, 1995.

Place: AT&T Bell Laboratories, 67 Whippany Rd., Whippany, N.J.

Information: For directions or up-to-date meeting status call (201) 736-0771. For other questions regarding the Consultants Network, call Jim Boyd (201) 584-0329.

Vehicular Technology Soc.: Resource Auction Multiple Access In The Cellular Environment

On February 28, 1995, the North Jersey Chapter, IEEE Vehicular Technology Society will present a talk on "Resource Auction Multiple Access In The Cellular Environment." The speaker will be Dr. Noach Amitay of ATT Bell Labs, Holmdel, N.J..

Time: 7:30 PM, Tuesday, February 28, 1995.

Place: KDI/Triangle Electronics Inc., 60 South Jefferson Road, Whippany, N.J. (Route 287 to Route 10 exit.)

Information: Mel Lewis (914) 968-2500, ext. 2304, or Art Greenberg (201) 492-1207.

NJ Entrepreneurs' Network: Legal And Financial Problems Of Entrepreneurs

The IEEE North Jersey Entrepreneurs' Network will meet on January 17, 1995.

Legal aspects and financial dangers are the urgent problems faced by entrepreneurs. Many of the initial attendees at the October 1994 meeting were interested in sharing their own experiences, so we will be hearing from them at our meetings.

All welcome. Please come and join us.

Time: 7:00 PM, Tuesday, January 17, 1995.

Place: Conference Room, Suburban Cablevision, 800 Rahway Ave., Union, N.J.

Further Information: Maitland McLarin Chairman. (201) 335-6847.

North Jersey Section Activities January 1995

January 4, 1995—"North Jersey Section Executive Committee Meeting"—7:00 PM, Plant 11, GEC-Marconi, 164 Totowa Road, Totowa, N.J. Mel Lewis (914) 968-2500, Ext. 2304.

Jan. 10—"Motion Analysis In Biomedical Research"—Metropolitan Section EMBS, 7:30 PM, Rockefeller Univ., Tower Bldg., Rm. 305, 1200 York Ave., NYC. Joel Levitt (718) 891-6460.

Jan. 12—"Plans And Goals For 1995"—North Jersey Section PACE, 7:30 PM, JCP&L Co., 300 Madison Ave. & Punch Bowl Rd., Morristown, N.J. Robert Sinusas (201) 228-3941.

Jan. 17—"Legal And Financial Problems Of The Entrepreneur"—North Jersey Entrepreneurs' Network, 7:00 PM, Conference Room, Suburban Cablevision, 800 Rahway Ave., Union, N.J. Maitland McLarin (201) 335-6847.

Jan. 17—"Accurate, Efficient And Inexpensive Electromagnetic Simulation"—IEEE North Jersey MTT/AP Chapter, 7:00 PM, NJIT, 2nd Floor Conference Rm., 202 ECE Building, Newark, N.J. Chandra Gupta (201) 633-4469.

Jan. 17-March 21—"Seminar: Object-Oriented C++ Programming"—IEEE North Jersey Section, 10 Sessions, evenings 6:30-9:00 PM, JCP&L Co., 300 Madison Ave., Morristown, N.J. John A. Baka, (201) 455-8534.

Jan. 18-March 29—"Seminar: Introductory C Programming"—IEEE North Jersey Section, 8 Sessions, evenings 6:30-9:00 PM, JCP&L Co., 300 Madison Ave., Morristown, N.J. John A. Baka, (201) 455-8534.

Jan. 26—"Talk On Internet"—Consultants' Network of Northern New Jersey, 7:30 PM, AT&T Bell Labs, 67 Whippany Rd., Whippany, N.J. Jim Boyd (201) 584-0329.

Jan. 29-Feb. 2—"Winter Power Meeting Highlights Student Activities"—IEEE Power Engineering Society, New York Hilton Hotel, 53rd Street & Ave. of the Americas, NYC. Mustapha Karmouni (718) 720-0651.

Upcoming Meetings

Feb. 1—"North Jersey Section Executive Committee Meeting"—7:00 PM, Plant 11, GEC-Marconi, 164 Totowa Road, Totowa, N.J. Mel Lewis (914) 968-2500, Ext. 2304.

Feb. 28—"Resource Auction Multiple Access In The Cellular Environment"—North Jersey Chapter, IEEE Vehicular Technology Society, 7:30 PM, KDI/Triangle Electronics Inc., 60 S. Jefferson Road, Whippany, N.J. Mel Lewis (914) 968-2500, ext. 2304.

**Members and Non-Members Welcome
PLEASE POST**

* * * * *

Vehicular Technology Soc.:

1995 Symposium Call For Papers

The North Jersey Section of the Vehicular Technology Society is sponsoring a one day Symposium on Saturday, October 28, 1995 to be held at the Meadowlands Hilton.

The Symposium will be the first of what is hoped will be an annual event. It will address any and all topics of vehicular technology including personal communications; vehicular electronics, including control, collision avoidance, communication, and Intelligent Vehicle Highway Systems; and transportation systems.

The number of sessions will be dependent on the number of papers submitted. A call for papers has been announced and local members are encouraged to submit an abstract of up to 400 words for review. Abstracts should be submitted to Arthur Greenberg, RS Microwave Company, 22 Park Place, Butler, NJ 07405-0273.

* * * * *

AWARDS RECEPTION

NY/NJ/LI EMBS: Motion Analysis In Biomedical Research

On January 10, 1995, the Metropolitan Section Engineering in Medicine and Biology Society will present "Motion Analysis In Biomedical Research." The speaker will be Dr. Jean Louis Coatrieux.

About The Talk

The talk will deal with Motion Analysis, drawing on the speaker's expertise with Three Dimensional Image Analysis, Signal Processing, Pattern Recognition, and Knowledge-Based Systems with applications in medicine.

About The Speaker

Dr. Coatrieux received his EE degree from the Polytechnic Institute of Grenoble (1970), his first doctorate (1973) and his State Doctorate in Sciences (1983) from the University of Rennes, France. He was an Asst. Professor (1970-75) and an Assoc. Professor (1976-86) at the Institute of Technology of Rennes. Since 1986, he has been the Director of Research at the INSERM (National Institute for Health and Medical Research, France), and an Adjunct Professor at the New Jersey Institute of Technology (1993-present). Dr. Coatrieux is also a Professor at the Telecom Bretagne in France. He is currently the Chairman of the Laboratoire Traitement du signal et de L'Image in the University of Rennes, the Vice President for Publications and Technical Activities of the IEEE-EMBS (1993-1994) and a member of the Scientific Boards in the Commission of the European Community (Esprit and Biomed Programs).

Dr. Coatrieux was the Conference Co-Chair of the 1992 IEEE-EMBS Conference in Paris and he founded the first International Summer School of the IEEE-EMBS, held in Brittany (France) in July 1994. He has published over 100 papers in Journals and Conferences and has given more than 50 lectures at the International level.

Time: 7:30 PM , Tuesday, January 10, 1995.

Place: Rockefeller Univ., Tower Bldg., Room 305, 1200 York Avenue, NYC.

Directions/Parking: Entrance gate at 66th Street. Free parking. By subway—68th on #6 (Lex). By bus—M15, M31, M58, or M66.

Further Information: Joel Levitt (718) 891-6460; Andrew Baxt or Susan Baxt (516) 678-6563.



Four of the recently elected Fellows from the North Jersey Section attended the Awards Reception held at the Birchwood Manor on October 21, 1994. From left to right, they are Jesse Russell of AT&T Bell Labs, Richard Shively of AT&T Bell Labs, Charles Huang of Anadigics Inc., and Benjamin Melamed of C&C Research Laboratories NEC USA Inc. Two new Fellows who could not attend are James Daly of BICC Cables Corporation and Stephen Pardee, a consultant.



PACE Chairman Robert Sinusas, on the right, accepted The Alex Gruenwald Region I PACE Award from Richard Ackley, Region I Director, on behalf of the Section.



Richard Ackley, Region I Director, presents a Region I Award to Richard Snyder. Howard Leach and Kenneth Oexle also received Region I Awards at the Reception.

IEEE North Jersey Section Seminar Object-Oriented C++ Programming

Tuesdays, January 17 - March 21, 1995

Jersey Central Power & Light Co., 300 Madison Avenue, Morristown, N.J.

The North Jersey Section is offering an evening course entitled "Object-Oriented C++ Programming." Object-Oriented programming has been described as the biggest advance in computer programming since the creation of higher level languages 30 years ago. 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, by far, the most widely used language today for object-oriented design and programming. This course will cover both the concepts of OOD and their implementation in C++ code. The course will begin with a review of common aspects of C and C++ but this time will be too brief to learn C. **THEREFORE ONLY THOSE WHO ARE FAMILIAR WITH C SHOULD REGISTER FOR THE C++ COURSE.**

There will be ten weekly lectures and homework will be assigned and corrected. The topics listed below will be covered. The instructor is Dr. Edward (Ted) Byrne, owner of a software consultant business.

TOPICS:

- (1) - Review common elements of C and C++: punctuation and keywords, variable naming, typing and scope, functions and subfunctions, arguments, operators and assignments, conditionals and logical variables, looping and testing, handling text strings, arrays and structures, pointers.
- (2) - Concept of Object-Orientation: objects and classes of objects, methods and messages, encapsulation and abstraction, overloading of functions and operators, inheritance and polymorphism.
- (3) - C++ improvements to C: new commands and operators, comments, stream I/O, function prototypes, more explicit typing and linking.
- (4) - 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.
- (5) - Encapsulation and abstraction within C++ objects: references and aliases, scope control operator, 'this' object, overloading, functions, operators.
- (6) - Inheritance and polymorphism among C++ objects: parent class or object, extending classes, redefining object data and methods, multiple inheritance, templates.
- (7) - C++ I/O streams: standard I/O, formatted I/O with manipulators, disk and device I/O.
- (8) - C++ library classes and their use: characteristics of a good library class, conversion base classes, video base classes, window base classes, database base classes.
- (9) - 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.
- (10) - Object-Oriented design methodologies: Booch method, Coad Yourdon Nicola method, Shlaer Mellor method.

Class size will be limited to a maximum of 25 with a minimum registration of 15. Early registration is recommended. Phone reservations will NOT be accepted. Reservations accepted after January 3, 1995 will require an additional late fee of \$25. No reservations will be accepted after January 6, 1995.

Where: Jersey Central Power & Light Co., 300 Madison Avenue, Morristown, N.J.
When: Ten sessions, Tuesday evenings starting January 17, 1995, 6:30 PM to 9:00 PM.
Cost: With Text Book and Borland Turbo C++ Compiler: IEEE Members \$280; Non-IEEE Members \$370.
With Text Book only: IEEE Members \$200; Non-IEEE Members \$290.
Contact: Mr. John A. Baka at (201) 455-8534 (Business)

Registration "Object-Oriented C++ Programming"

5NJ-

To: Mr. John Baka, Distribution Engineering, JCP&L Company, 300 Madison Avenue, Morristown, NJ 07962-1911

Name _____ IEEE No. _____

Affiliation _____ Phone No. _____

Address _____

Check if Borland Turbo C++ Compiler is needed or not Yes [] No []

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

Signature _____

Letter To The Editor

RE: **Workforce 2000 ... (Nov. Issue)**

The subject article by Edith Holleman is not only very interesting, but shows courage by presenting some unpleasant facts. Unfortunately (but perhaps expectedly) the View from Capitol Hill stops short of proposing solutions.

In the long run, unification of the world economy is probably inevitable. But for obvious reasons the pols pushing GATT and free-trade zones choose not to mention the resulting export of jobs on all levels. And Ross Perot, who did predict "the giant sucking sound", was not effective in spreading the word.

Neither was the IEEE, to the extent it even tried. Futurists like the Tofflers have predicted that in the "post-industrial" scenario, "third-wave" nations like us will pay for the import of manufactured goods with "knowledge", gushing from consultants, programmers, engineers, etc. Alas, as IEEE members have found out by now, India, China, and even minor players have developed enough technical knowledge of their own, thank you.

So where does that leave us? As I see it we have only three choices: (1) get some exported industries back, or (2) become better engineers than our Asian competitors, or (3) work more for less.

Ad 1: How can we rebuild such industries as consumer electronics when the same beancounters who shipped them overseas still hold the reigns? There are some encouraging signs: start-ups have begun to emulate the Japanese by buying components from cheaper producers. But they assemble them here in specifically American configurations. Like 50 years ago, the founders are often engineers—and mostly underfinanced. Here, Capitol Hill could help, once their GATT dreams become nightmares.

Ad 2: This option poses even tougher challenges. Not only will American colleges have to turn out a superior "product" but they will have to persuade American employers to "buy" it. In most

of the world, engineers graduate at the masters' level, which puts them a jump ahead to start with. Nor are American engineering students anxious to spend another two years in the classroom—and slide even deeper into debt.

I think the biggest challenge will be to change our deeply ingrained hiring practices. American employers prefer glorified technicians, who can immediately sit down at one specific CAE station, and crank out one specific product in the most fashionable technology *du jour*. Nor does it help that engineering recruiters often don't know what they are looking for.

I vividly remember when my boss put a young Indian engineer in my group to check him out. The fellow had been grudgingly hired under some external pressure, and my boss apparently expected me to veto the engagement. Alas, within half an hour I realized that this guy knew more about the task at hand than the rest of us put together. Then it took me half a year to convince management of that fact.

Which brings me to (3): the reluctant conclusion that I probably won't live to see job prospects of EEs turn around. My only hope is that we can expand our current lead in digital audio-visual technologies, and that we won't so readily export the associated consumer-products industry this time around.

The well-paid jobs that free trade is supposed to bring to our shores, I'm afraid, will mostly go to lawyers. Hopefully they will earn their generous keep by protecting our intellectual property rights more vigorously than did those retained by my own employer of 17 years. They were more inclined to drop a patent application than to file it, and I didn't really care. After all, I had already signed away all patent rights in my employment contract.

Now *there* is a problem where the IEEE can make a difference.

With best regards,
Max J. Schindler

Upgrade To Senior Member

You may be qualified to become a Senior Member. You are required to have ten years of experience. A Bachelors degree counts for three of those years and advanced degrees each count for one year.

Get information by contacting Don Weinstein, Kulite Semiconductor, One Willow Tree Rd., Leonia, N.J. 07605-2239, (201) 461-0900, ext. 3106.

Engineers Network Association

If you are an experienced engineer seeking employment at a salary of at least \$35,000 per year, we invite you to join the Engineers Network Association, a metro area weekly forum for career networking and the exchange of job leads. Bring at least one unpublicized job lead that you do not intend to pursue, to share with others who may be interested. Dues are \$2 per meeting.

The Engineers Network Association meets 1:30 PM, every Wednesday at the Annunciation Church, W. 50 Midland Avenue, Paramus, N.J. G. S. Parkway to exit 163, then Route 17 north for 1/2 mile to "Midland Ave. (west) - Glen Rock" exit; Annunciation Church is just ahead on the left. From I-80: exit 62 to G.S. Parkway north, and proceed as above.

For further information, call Merrill Rutman (Member, IEEE), at (201) 447-6041.

It's coming soon . . . The 3rd annual

Directory of Consultants

published by the IEEE Consultants' Network of Northern NJ, will be distributed in January. The Directory is your best source for locating professional technical help. It contains addresses, phone numbers and technical overviews of active consultants in your area. Don't wait for a crisis to happen first, prepare now . . .

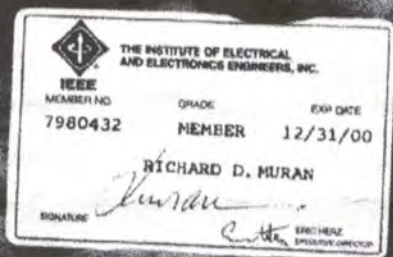
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1995 Education Committee Programs

The Education Committee has completed plans for the North Jersey Section IEEE course offerings for 1995. This issue of the newsletter includes registration information for spring courses on "Introductory C Programming", and "Object-Oriented C++ Programming."

Course offerings will also include C++ for Windows later in the spring and three others in the fall: "Object-Oriented C++ Programming", "Advanced Programming in the Language C" and "Introduction to PC Operations for Engineers."

The Education Committee also desires to offer a course on UNIX. If anyone is willing to teach it, please call John Baka at (201) 455-8545.

Power Engineering Society Winter Power Meeting Highlights Student Activities

A host of student activities are planned for the IEEE Power Engineering Winter Meeting to be held from Sunday, January 29 through Thursday, February 2, 1995 in NYC.

The program includes:

- **Inspection Tours**
- **PES Poster Session with \$\$\$\$ prizes**
- **Student/Faculty/Industry Day**

including:

Panel Discussion on "Working in the Electric Power Industry"; Wally Read (President-Elect) as Luncheon Speaker; and "Job Hunting Skills Workshop" conducted by Ray Findlay, IEEE Region 7 Director (Canada).

North Jersey Section Student Members can pre-register for these Inspection Tours:

Monday Afternoon—Con Edison Ravenswood Generating Station and Energy Control Center.

Tuesday Morning—Princeton U. Plasma Physics Laboratory, Cogen Technologies.

Note: Buses leave 12:15 on Monday Afternoon and 7:00 AM on Tuesday Morning.

To pre-register and for additional information, contact Mustapha Karmouni at (718) 720-0651 or CCNY Student Branch at (212) 650-7154 or (sb.ccny@ieee.org) with Name, Address, Telephone Number, School, and Member Number.

Date: Sunday, January 29 thru Thursday, February 2, 1995.

Time: AT YOUR CONVENIENCE.

Place: New York Hilton Hotel, 53rd Street & Ave. of the Americas, NYC.

IEEE North Jersey Section Seminar "Introductory C Programming"

Wednesday Evenings, January 18 - March 29, 1995, 6:30-9:00 PM
Jersey Central Power & Light Co., 300 Madison Avenue, Morristown, N.J.

The North Jersey Section is offering an evening course entitled "Introductory C Programming." C is one of the most widely used computer programming languages because it is powerful, portable and permissive. It is also the basis for C++, the popular object-oriented programming language. This course will be an introduction to C and will cover all the basics of the language as well as emphasizing C's philosophy or world view. The course will cover ANSI C on the PC but, because there are C compilers for most computers, the expertise will be applicable from PC through mainframe. The C techniques learned will be useful on their own, and also will be a preparation for either an advanced C course or a C++ course.

There will be 8 weekly lectures and each will be followed by a short optional work session. Homework will be assigned and corrected. The topics listed below will be covered. The instructor is Dr. Edward (Ted) Byrne, owner of a local software consultant business.

TOPICS:

- (1) - Background of computers, operating systems, compilers and high-level languages.
- (2) - Introduction to C and the parts of a real C program: philosophy of C vs other languages, ANSI vs older C, nature and constituents of a simple C program, C program examples (ongoing).
- (3) - Reserved words, variables, declaration and definition, parameters, permanent, temporary, local and global data.
- (4) - Branching: simple and compound statements, relational operators and expressions and their use in branching, various kinds of branch statements.
- (5) - Loops and Conditions: various ways to enter and exit a loop, auto-incrementing, statement labels, goto.
- (6) - Formatted and character I/O: output to screen, input from keyboard, formatting, file and device input and output.
- (7) - Defensive programming and debugging: debugging levels, asserts, lint, case tools.
- (8) - Functions, subfunctions and arguments: names, arguments, return value, main program arguments, exit, return levels.
- (9) - Text and Libraries: character data type, string data type, characteristics of strings, libraries, and header files, #include statement, common functions, #define.
- (10) - Groups of similar and dissimilar data items: arrays, structures, indexing, items.
- (11) - Introduction to pointers: concept of a pointer, addresses, pointer arithmetic, indirection.
- (12) - Introduction to some advanced topics in C: touch on graphics, unions and enums, casts, typedefs, bit variables and operators, switch statement and case and default, conditional assignment.

Class Size will be limited to a maximum of 25 with a minimum registration of 15. Early registration is recommended. Phone Reservations will **not** be accepted. Reservations accepted after January 3, 1995 will require an additional **late fee** of \$25. No reservations will be accepted after January 6, 1995.

Where: Jersey Central Power & Light Co., 300 Madison Avenue, Morristown, N.J.
When: Eight sessions, Wednesday evenings, starting January 18 from 6:30 PM to 9:00 PM.
Cost: With Text Book and Borland Turbo C++ compiler
IEEE Members \$280; Non-IEEE Members \$360.
With Text Book only:
IEEE Members \$ 200; Non-IEEE Members \$280.
Contact: Mr. John A. Baka at (201) 455-8534 (Business)

Registration "Introductory C Programming"

8NJ

To: Mr. John Baka, Distribution Engineering, JCP&L Company, 300 Madison Avenue, Morristown, NJ 07962-1911

Name _____ IEEE No. _____

Affiliation _____ Phone No. _____

Address _____

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

Check if Borland Turbo C++ Compiler is needed or not Yes [] No []

Signature _____