

The



# IEEE Newsletter

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

## *NJ EDS, C&S, MTT/AP Chapters:* **Cost Effective UHF Switched Filter with Constant Bandwidth**

On February 12<sup>th</sup>, 2003, the IEEE NJ Section Electron Devices, Circuits and Systems and MTT/S/AP-S Chapters together with the New Jersey Institute of Technology will host a talk on "Switched Filter with Constant Bandwidth." The speaker will be Dr. Jim Benjamin of BAE Systems.

### **About the Talk**

Dr. Benjamin will present material co-authored by Robert Grange and will talk about a digitally tuned filter, tuning from 225 to 400 MHz, reconfigurable in step size and bandwidth, good intercept point.....a true state of the art device.

As part of the design of a modern communications system, measures must be taken to mitigate the effects of other collocated systems. These systems may be of the same design and operate in common frequency bands. The physical separation between these collocated systems may be minimal. Operation under these conditions require both attention to the linearity of the RF system design (very high IP3 points) and the incorporation of adequate filtering.

In the military bands the frequency assignments can vary. Many of the radios have either of both LPI and A/J modes of operation. This leads to frequency-hopped radios, a situation not generally dealt with in the commercial world. The filters must, of necessity, be more complex and frequency agile. This agility can significantly increase the cost and complexity of a system.

In this talk Dr. Benjamin will address the design of a cost effective frequency agile filter. Several of these filters were implemented in a recent system. The filter contains two sections using ceramic resonators and lumped constant input/output/interstage coupling. The coupling has been designed to minimize the bandwidth change with frequency. The filter is tuned with a capacitance decade switched using PIN diodes. The

tuning range is almost an octave.

The choice of a switched filter as opposed to a voltage or varactor tuned filter allows the unit to operate under a modest level of power, a condition required for effective co-site mitigation.

In this talk we will discuss in basic details the design of the filter. The results of simulations performed and test results of fabricated filters. The reasons for the deviations from simulations and results will be highlighted.

### **About the Speaker**

Dr. Jim Benjamin is a researcher at BAE Systems and previously was a professor at Marquette.

### **All Welcome!**

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

**Time:** 7:00 PM, Wednesday, February 12, 2003. 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 (973) 596-5739 ([dmisra@njit.edu](mailto:dmisra@njit.edu)) or Dr. Edip Niver (973) 596-3542 (NJIT).

## **North Jersey Student Activities Committee and GOLD Seek Volun- teers and Speakers**

The NNJ IEEE SAC and GOLD are seeking new volunteers to help conduct business at the section level for the benefit of students in the North Jersey section and surrounding areas. Additionally local student chapters are seeking speakers to give talks on professional and technical topics.

If you would like to speak on professional topics ranging from career development, time or project management, engineering experiences, and many more, or have specific technical topics and developments you would like to contribute, or even have some pet topics of your own, please contact the organizer below.

Additionally, the NNJ SAC is seeking volunteers to get involved at the section level to help organize local events for students and the GOLD membership in the NY-NJ Metro area. If you would like to help out even for short periods of time or maybe take on leading a committee in the section, please contact the organizer Amit Patel ([a.j.patel@ieee.org](mailto:a.j.patel@ieee.org)) to find out more and come to a section business meeting.

**FEBRUARY 2003**



PES/IAS:

## Integrated Electrical Assemblies

On March 20<sup>th</sup>, 2003, the Power Engineering and Industrial Applications Chapters will sponsor a technical meeting on "Integrated Electrical Assemblies." The speaker will be Mr. Wayne Celeste.

### About the Talk

Current trends in the electrical equipment design arena require that engineers fit more electrical distribution and control equipment into a smaller available space. Whether the project is a new construction retail store, or an electrical upgrade to an existing water treatment plant, the need for additional floor space is critical.

This speaker will explore several methods of consolidating electrical distribution equipment into one, space-saving assembly. Topics will include Integrated UL 891 switchboards, UL 845 Motor Control Centers, and small unit substation designs. In addition to floor space savings, the speaker will discuss additional advantages these designs offer, such as reduction in installed cost and time to project completion.

### About the Speaker

Mr. Wayne Celeste is a District Application Engineer at Cutler-Hammer.

**Time:** 7:00 PM, Thursday, March 20, 2003.

**Place:** Eaton/Cutler Hammer, 690 Rahway Ave, Union, NJ. Directions: Route 82 Morris Avenue from either Springfield or Union to Rahway Ave.

**Information:** Ron Quade (212) 833-0268.

## Conference Rooms Needed!

The North Jersey Section (Education Committee) is looking for conference room facilities to hold their training seminars. The seminars are being held on one weeknight from 6:30 PM to 9:00 PM. In lieu of providing the conference facility for free, the organization can get free registration up to three members in the course/seminar. Please contact Bhanu Chivakula, Co-chair, Education Committee at [b.chivakula@computer.org](mailto:b.chivakula@computer.org) for suggestions or discussions, if interested.

## IEEE North Jersey Section Activities February 2003

**Feb. 5**—"NJ Section Executive Committee Meeting" – 7:00 PM, ITT, 100 Kingsland Rd, Clifton, NJ. Dr. Sanghoon Shin at (973) 492-1207 Ext. 22 or [s.shin@ieee.org](mailto:s.shin@ieee.org).

**Feb. 11**—"Unemployed Engineers" – NJ PACE, 6:30 – 8:30 PM, Clifton Memorial Library, 292 Piaget Ave, Clifton, NJ. Richard F. Tax, (201) 664-6954 ([rtax@bellatlantic.net](mailto:rtax@bellatlantic.net)), Paul Ward (973) 790-1625 ([PWard1130@aol.com](mailto:PWard1130@aol.com)).

**Feb. 12**—"Cost Effective UHF Switched Filter with Constant Bandwidth" – EDS, C&S, MTT/AP Chapters, 7:00PM (buffet at 6:15PM), NJIT, 202 ECE Center, Newark, NJ. Dr. Richard Snyder (973) 492-1207, Dr. Durga Misra (973) 596-5739 ([dmisra@njit.edu](mailto:dmisra@njit.edu)), or Dr. Edip Niver (973) 596-3542.

**Feb. 13**—"Scheduling in Terabit Packet Switches" – NJ Communications Chapter, 6:15 PM, NJIT, 202 ECE Center, Newark, NJ. Dr. Nirwan Ansari (973) 596-3670 ([nirwan.ansari@njit.edu](mailto:nirwan.ansari@njit.edu)), Amit Patel ([a.j.patel@ieee.org](mailto:a.j.patel@ieee.org)). Please check <http://web.njit.edu/~ieeenj/comm.html> for the latest updates.

**Feb. 20**—"Project Management: Microsoft Project 2002 Benefits, Tips and Techniques" – NJ EMS and Computer Chapters, 7:00 PM, Crestron Electronics, Training Room 2, Rockleigh, NJ. Wayne Owens, (201) 767-3400 x226 ([wowens@ieee.org](mailto:wowens@ieee.org)).

**Feb. 25**—"NJ Nanotechnology Consortium (NJNC) and Bell Labs MEMS Journal Club - Topics: MEMS history, Soft MEMS using liquids, and Lucent MEMS Technology: system and reliability aspects; with optional NJNC Tour- Meeting: 7:30-9:00 PM, NJNC Tour at 6:30 PM, Lucent Technologies, Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ. Register at [www.njnano.org](http://www.njnano.org). Warren Lai (908) 582-6140 ([warren.lai@lucent.com](mailto:warren.lai@lucent.com)).

**Feb. 27**—"Setting and Maximizing Price On Your Consulting Services" – NJ Consultants' Network, 7:30 PM, MCE/KDI Triangle, 60 S. Jefferson Rd, Whippany, NJ. Robert Walker (973) 728-0344 or [www.TechnologyOnTap.org](http://www.TechnologyOnTap.org).

### Upcoming Meetings

**Mar. 5**—"NJ Section Executive Committee Meeting" – 7:00 PM, ITT, 100 Kingsland Rd, Clifton, NJ. Dr. Sanghoon Shin at (973) 492-1207 Ext. 22 or [s.shin@ieee.org](mailto:s.shin@ieee.org).

**Mar. 11-Apr. 29**—"Object-Oriented C# Design & Programming" – North Jersey Section, Tuesday Evenings, 8 sessions, 6:30-9:00 PM, Ramada Inn Clifton, 265 Route 3 East, Clifton, NJ. Bhanu Chivakula ([b.chivakula@computer.org](mailto:b.chivakula@computer.org)).

**Mar. 11 & 12**—"IEEE Sarnoff Symposium 2003 - Advances in Wired and Wireless Communications" – 3/11 2:30-6:00 PM, 3/12 8:00 AM-6:00 PM, The College of New Jersey, Ewing, NJ. Dr. Gerhard Franz (609) 936-1919 ([g.franz@ieee.org](mailto:g.franz@ieee.org)) or see <http://www.sarnoffsymposium.org>.

**Mar. 15**—2004 IEEE Fellow Nominations Due.

**Mar. 20**—"Integrated Electrical Assemblies" - NJ IAS/PES Chapters, 7:00 PM, Eaton/Cutler Hammer, 690 Rahway Ave, Union, NJ. Ron Quade (212) 886-0275.

**Mar. 20**—"Security and the Small Office/Home Office Network" – NJ Consultants' Network, 7:30 PM, MCE/KDI Triangle, 60 S. Jefferson Rd, Whippany, NJ. Robert Walker (973) 728-0344 or [www.TechnologyOnTap.org](http://www.TechnologyOnTap.org).

**Apr. 25 & 26**—"The 12th Annual Wireless and Optical Communications Conference", 8:00 AM-5:50 PM, Wyndham Hotel, Newark, NJ. Dr. Hongya Ge, (973) 642-4990 ([ge@njit.edu](mailto:ge@njit.edu)) or see <http://www.wocc.org> for additional details.

**May 4**—"NJ Section Awards Reception" – 3:00 to 6:00 PM at the Birchwood Manor, 111 North Jefferson Rd, Whippany, NJ. Anne Giedlinski (973) 377-3175.

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

## *NJ Communications Society:* **Scheduling in Terabit Packet Switches**

On February 13, 2003, the IEEE North Jersey Section Communications Society Chapter along with NJIT will host a presentation on "Scheduling in Terabit Packet Switches." The speaker will be Dr. Aleksandra Smiljanić.

### **About the Talk**

In this talk, a scheduling algorithm for high-capacity packet switches and its performance will be described. Packet switches with input buffers have been built to provide terabit switching capacity. The sequential greedy scheduling (SGS) algorithm designed for these switches is scalable due to its linear structure and minimal control information exchanged among inputs. The SGS algorithm switches packets without blocking them through a fabric with the speed up of two. Namely, a switch run by the SGS algorithm will pass arbitrary traffic pattern as long as its outputs are not overloaded. Consequently, the SGS algorithm allows agile bandwidth reservations in a high-capacity packet switch. Modified SGS supports switching of multicast traffic as well. Multicast packets are forwarded through a switch, so that their transmission is balanced over the switch ports. In this way, a switch with a moderate speed-up transports contents whose popularities change arbitrarily in magnitude and over time.

### **About the Speaker**

Aleksandra Smiljanić (M '96) received MA and PhD degrees in electrical engineering from Princeton University in 1996 and 1999, respectively. She completed her BSc Degree in electrical engineering at Belgrade University in 1993. She has worked for AT&T Labs since 1999 on scheduling protocols. She has taught several courses at Princeton and Belgrade Universities. She received the Best Paper awards for the papers presented at the IEEE Workshop on High Performance Switching and Routing 2000, and IEICE/IEEE Workshop on High Performance Switching and Routing 2002, respectively. She is a recipient of the Aleksandar Damjanović Prize as the best student in her class at Belgrade University, 1993.

### **All Welcome!**

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

**Time:** 6:15 PM (refreshments start at 6:00 PM), Thursday, February 13, 2003.

**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. Nirwan Ansari (973) 596-3670 ([nirwan.ansari@njit.edu](mailto:nirwan.ansari@njit.edu)), Amit Patel ([a.j.patel@ieee.org](mailto:a.j.patel@ieee.org)), or check <http://www-ec.njit.edu/~ieeenj> for the latest updates. Directions to NJIT can be found at <http://www.njit.edu/University/Directions.html>.

## **Open Registration for North NJ 2003 Presentation Contest**

If you missed the call for participants in last month's newsletter, then here is a friendly reminder of the upcoming Student Presentation Contest for Spring 2003. If you would like to read more details about types of presentations that can be made, examples of last year's winning abstracts and topics, and other venue information, be sure to check out the SAC website listed below.

Registration for this year's contest has already begun. All participants MUST register before they can be allowed to compete in the contest. Due to the fantastic demand that we had last year, this year, the number of participants must be capped to some maximum. So if you want to be in this year's contest, you must register right away before it fills up.

On the website listed below, you will find details about the contest, some local guidelines to be used for the presentations and judging forms for the criteria upon which the contestants will be judged. The time limits given are a maximum, and the limits will be enforced to ensure fairness, so remember to practice. And of course, the registration form is there!

This North Jersey Section Contest is open to graduate and undergraduate students and first/second/third place prizes will be awarded in each category for the amounts of \$100/\$75/\$50.

The exact date and time will be posted on the website below. The contest is scheduled for late February at FDU in Teaneck, NJ. Free parking is available, dinner will be served, and this will be a memorable and rewarding experience.

Any and all questions can be emailed to the contest organizer, [a.j.patel@ieee.org](mailto:a.j.patel@ieee.org) and check out the website:

[http://ewh.ieee.org/r1/north\\_jersey/sac](http://ewh.ieee.org/r1/north_jersey/sac)

## *NJ Consultants' Network:* **Security and the Small Office / Home Office Network**

On Thursday evening, March 20<sup>th</sup>, the IEEE Consultants' Network of Northern NJ present a talk on "Security and the Small Office/Home Office Network" given by Frank Middleton of Apogee Communications Technologies, Inc. Security is a major concern for anyone connected to the Internet and this session addresses some solutions and their limitations.

### **About the Talk**

Computers connected to the Internet modems with no intervening firewall are vulnerable to many threats beyond that of email-carried viruses. A properly configured firewall/router between the SOHO LAN and the modem can mitigate this risk effectively. Most popular routers also do support secure tunnels over the Internet, so, for example, you can connect your home network to your office network securely and cheaply. Terms such as DHCP, DMZ, NAT, PAT, IPSec, TLS, etc. will be explained; no prior knowledge of networking is required.

Topics will include:

- Security at different layers of the Open Systems Interconnect Reference Model
- How does NAT/PAT provide additional security?
- Hosting a web site behind a DHCP DSL/Cable modem through a NAT/PAT firewall router
- Connecting networks together securely over the Internet at very low cost
- A solution for WiFi (IEEE 802.x) security issues

### **About the Speaker**

Frank Middleton, a member of C>NNNJ, has more than 20 years of experience in networking, security, infrastructure and applications architecture, design and implementation. He can be reached at (973) 543-9324 or [fam@apogeect.com](mailto:fam@apogeect.com).

### **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. Admission is free.

**Time:** 7:30 PM, Thursday, March 20<sup>th</sup>, 2003.

**Place:** MCE/KDI Triangle, 60 S.

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Jefferson Rd, Whippany, NJ. (Entrance at rear of building)

**Information:** For directions and up-to-date meeting status, call Robert Walker (973) 728-0344 or visit our website at [www.TechnologyOnTap.org](http://www.TechnologyOnTap.org).

To download a map to KDI, go to: <http://www.kditriangle.com/directions.htm>.

## *NJ EMS and Computer Chapters:* **Project Management: Microsoft Project 2002 Benefits, Tips and Techniques**

On February 20<sup>th</sup>, the IEEE North Jersey Section Engineering Management Chapter and Computer Chapter will host a presentation on "Microsoft Project 2002 Benefits, Tips and Techniques" by Karin White.

### **About the Talk**

Managing the complexities of today's projects requires among other things good people, proven processes, efficient tools and a structure supporting the effort. To better capitalize on the investment in tools a better understanding of what tools have to offer is key. In addition, what support may be available once a tool selection is made can reduce the learning curve significantly.

This presentation will focus on the benefits of using a project-scheduling tool; how the tool scales from a single project to an enterprise with multiple sites, programs and projects; what it takes to capitalize on the features of the tool and the ability of the tool to provide assistance with process templates such as PMI's PMBOK; how the tool fits in various project types from hardware to software to processes controls and beyond...

### **About the Speaker**

Karen White has over twenty-five years experience in the software development and project management fields. She is the Director, Resource Management for PM Solutions, where her responsibilities include management of the corporation's consulting associates and overseeing quality of delivery of management consulting services within the company's IT business practice. Karen is also the "knowledge leader" for the company's software engineering process improvement services.

An active member of the Project Management Institute, Karen currently serves on the Ethics Review Committee and the PMI Awards MAG. She previously served on PMI's Board of Directors, several member advisory groups and co-chaired the PMI'96 Annual

Seminar/Symposia. She also served in several positions within the Mass Bay Chapter. Karen is active in IEEE Computer Society's Technical Council on Software Engineering, where she was a member of executive advisory boards and the program chair for several software/business reengineering conferences. Karen is profiled in Who's Who In America and Who's Who In the World. She holds an MS in Information Systems from Northeastern University's Graduate School of Engineering.

### **All Welcome!**

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

**Time:** 7:00 PM, Thursday, February 20, 2003. Light dinner will be starting at 6:30 PM.

**Place:** Crestron Electronics, Training Room 2, Rockleigh, NJ. Directions are available at [http://www.crestron.com/company\\_info/directions.asp](http://www.crestron.com/company_info/directions.asp)

**Information/Registration:** Wayne Owens, (201) 767-3400 x226 ([wowens@ieee.org](mailto:wowens@ieee.org)). Admission is free. Pre-registration is requested. Email to [wowens@ieee.org](mailto:wowens@ieee.org) name, organization, email address, IEEE EM member y/n.

*NJ Nanotechnology Consortium  
(NJNC) and Bell Labs MEMS  
Journal Club:*

## **MEMS History, Soft MEMS Using Liquids, and Lucent MEMS Technology: System and Reliability Aspects; With Optional NJNC Tour**

On February 25, 2003, NJ Nanotechnology Consortium (NJNC) and Bell Labs MEMS Journal Club will host presentations on several topics: MEMS history, Soft MEMS using liquids, and Lucent Bell Labs Microsystem Integration and Technology: systems and reliability aspects. The speakers will be Dr. Bill Trimmer, Dr. Tom Krupenkin, Dr. Jungsang Kim and Dr. Herb Shea.

### **About the Talk**

The NJ Nanotechnology Consortium (NJNC) is an industry-academia-government consortium to take nanotechnology from concept to commercialization. The nanofabrication clean room and e-beam facility are at Bell

Labs, Lucent Technologies at Murray Hill, NJ. The projects range from basic research to advance prototypes in products, with applications spanning microelectronics and telecommunication to biomedical and pharmaceutical. The topics include the history of MEMS (including MEMS done at the NJNC clean room as early as the '80s) and the MEMS activities at NJNC and Lucent Bell Labs that span the full spectrum of application.

### **Agenda:**

- 5:30 PM Optional Pay-Your-Own Dinner at local restaurant
- 6:30 PM Optional NJNC Nanofabrication Tour: 45 min
- 7:00 PM Refreshments
- 7:30 PM Journal Club Meeting commences
- 7:35 PM "History of MEMS" by Bill Trimmer
- 7:50 PM "Soft MEMS: Building an Optical Micromachine out of Liquids" by Tom Krupenkin
- 8:25 PM "Lucent MEMS Technology and Integration: Part II: Systems Aspect" by Jungsang Kim
- 8:40 PM "Lucent MEMS Technology and Integration: Part III: Reliability" by Herb Shea
- 9:00 PM Q/A and Networking

### **About the Speakers**

- Dr. Bill Trimmer, President, Belle Meade Research
- Dr. Tom Krupenkin, MTS, Wireless Packaging Research Dept., Bell Labs, Lucent Technologies
- Dr. Jungsang Kim, Technical Manager, Wireless Packaging Research Dept., Bell Labs, Lucent Technologies
- Dr. Herb Shea, Technical Manager, Micromechanics Research Dept., Bell Labs, Lucent Technologies

### **All Welcome!**

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

**Time:** 7:30 PM, Tuesday, February 25, 2003. (Optional Pay-Your-Own Dinner at local restaurant at 5:30 PM, Optional NJNC Tour at 6:30 PM, Refreshments at 7:00 PM. Register at [www.njnano.org](http://www.njnano.org).)

**Place:** Lucent Technologies, Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ 07974. Directions are available at [www.njnano.org](http://www.njnano.org).)

**Information:** Dr. Warren Lai (908) 582-6140 ([warren.lai@lucent.com](mailto:warren.lai@lucent.com)). Register at [www.njnano.org](http://www.njnano.org).

# IEEE 2003 SARNOFF SYMPOSIUM

The College of New Jersey  
March 11-12, 2003

## ADVANCES IN WIRED AND WIRELESS COMMUNICATIONS

### SYMPOSIUM PROGRAM

**March 11-12, 2003**

**The College of New Jersey, Ewing, NJ**

**<http://www.sarnoffsymposium.com>**



Sponsored by:

IEEE Princeton Section, IEEE Microwave Theory and Techniques Society, IEEE Communications Society, IEEE Electron Devices Society, TCNJ Engineering Department and TCNJ IEEE Student Branch

# IEEE AWARDS RECEPTION

*North Jersey Section  
May 4, 2003  
Birchwood Manor, Whippany NJ*

*A time to relax, unwind and enjoy --  
A time to pay tribute to our new Fellows --  
A time to honor our Award Winners --  
YES it's time for the Annual Section Reception*

The Annual Section IEEE Awards Reception will be held at the Birchwood Manor, 111 North Jefferson Road, Whippany again this year. The affair is scheduled for **Sunday, May 4, 2003** from 3 to 6 PM. Tickets are \$35.00 each and include a complete prepaid, two-hour open bar, hors d'oeuvres, buffet, and dessert. Spouses and guests are welcome. We are limited to 90 attendees, so please make your reservations early.

**Reservations are required by April 28, 2003.** Complete the reservation form and return it with your payment. If you would like tickets mailed back to you, please enclose a self-addressed **stamped** envelope. Otherwise, your tickets will be held at the door for you. If any additional information is required concerning the reception, contact Anne Giedlinski at (973) 377-3175.

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Use this form for Reception reservations. **ENCLOSE A SELF-ADDRESSED STAMPED ENVELOPE to receive tickets in advance.** **Reservations are required by April 28, 2003.** Mail reservation request to:

Anne Giedlinski  
299 Brooklake Road  
Florham Park, NJ 07932

Enclosed is \_\_\_\_\_ for \_\_\_\_\_ ticket(s) at \$35.00 each (make check payable to **North Jersey Section IEEE**) for:

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

# IEEE North Jersey Section Seminar

## OBJECT-ORIENTED C# DESIGN & PROGRAMMING

Tuesday Evenings, March 11, 2003 through April 29, 2003, Eight weekly classes

(March 11, 18, 25, April 1, 8, 15, 22 and 29) from 6:30 PM to 9:00 PM

Ramada Inn Clifton, 265 Route 3 East, Clifton, NJ 07014

(Checks should not be mailed to this address)

### ABSTRACT

Microsoft has created a new programming language, C# (Sea Sharp) as part of its new .NET development environment. Although MS still supports Visual basic and C++ (and maybe Java), clearly C# is its language of choice for Windows and Internet usage, and will be its best-supported language. C# is an Object-Oriented language of course. It is more powerful than VB but still allows simple programs to be created in the VB drag-and-drop tradition. It is simpler than C++ but still allows complicated programs with more obvious code.

This course covers the C# language itself, the sizeable libraries that support it, the ability to create screen images (for console or internet) and use of the MS Visual .NET development suite. This course begins with the environment and motivation for C# and mechanics of the language. It then describes C#'s ways to declare classes and use objects of those classes. Special facilities for creating Windows, or internet, programs are treated. A downloadable command line compiler can be used, however, the elegant visual .NET development suite is also described.

Finally several C# software engineering capabilities to enhance development efficiency and reliability are covered. Design is covered using UML. The course has a practical, "how-to-do-it" approach.

### TARGET AUDIENCE

This is not a course in how to program computers. It is intended to extend the capabilities of those who are already programmers so a familiarity with foundation programming concepts will be very helpful. But O-O programming is still programming so the course will cover concepts, implementation and practical aspects of using C#.

### COURSE TOPICS

1. What is the programming environment today: What is C#, why did Microsoft create it and where do they expect it to go.
2. C# classes and object instantiation: Fields and constructor and other methods, visibility, how classes encapsulate the real world and its characteristics.
3. Characteristics of code within methods: names, data types, operators and keywords, expressions and statements, control mechanisms for branching and looping, how everything is a class, value and reference types, boxing.
4. Mechanics of program creation: compilers, emulators, jit, formatting, layout, debugging, and testing, documentation and comments, O-O design, UML, development tools.
5. Anatomy of a console C# program: main, elementary input and output, static members.
6. Inheritance and derived classes: use of library classes, some special classes such as string, namespaces and using, other object interaction.
7. Deeper into classes and objects: delegates, properties, overloading methods, Interfaces, for each, containers and enumerators.
8. The concept of Windows programs: events and handlers, use of the mouse, the large Forms library, commonality between console and internet, examples of windows programs.
9. Engineering issues, garbage collection, unmanaged code, attributes, finalize, threads, ref and out, file I/O, efficiency and real-time.
10. Other actors in the game: XML, COM+, SOAP, ADO, Regex.

Class size will be limited to a maximum of 25. Early registration is recommended. The members are required to pre-register by calling Mr. Bhanu Chivakula on (732) 718-3818. Registration and checks are accepted only after pre-registration.

<b>WHERE:</b>	Ramada Inn Clifton, 265 Route 3 East, Clifton, NJ. (Checks should not be mailed to this address)
<b>WHEN:</b>	8 Sessions, Tuesdays on March 11, 18, 25, April 1, 8, 15, 22 and 29; Time: 6:30-9:00 PM
<b>COST:</b>	With textbook or notes: IEEE (& affiliate) members \$300; Non-IEEE members \$400.
<b>CONTACT:</b>	Bhanu Chivakula - email b.chivakula@computer.org.

### REGISTRATION: OBJECT-ORIENTED C# DESIGN & PROGRAMMING

Please send checks with this form to Bhanu Chivakula, 19 Prestwick Way, Edison, NJ 08820. Include the sender's address and mark the envelope "OBJECT-ORIENTED C#."

(Checks payable to "North Jersey Section IEEE" with registration form should be mailed to this address)

Direct inquiries via email to B.Chivakula@computer.org.

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 4, 2003. In general, the effective date of the application corresponds to the date when BOTH a fully completed application/registration and payment are received.

Tuition receipt will be mailed only if this box is checked

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