In our world we have conflicts not only on the battlefield but in our homes, offices, laboratories and the minds and souls of scientists and engineers. It is because the scientist or engineer has the capability and potential for doing so much more than his daily job tasks that he is faced with another commitment. He realizes and understands that the startling developments of our day must be used for the benefit of mankind . . . not its detriment. He knows that the welfare and happiness of our society in the future is being shaped today. Therein lies the reason as to why his responsibility to society and himself is so important: pure science and engineering divorced from the social problems of our age do not exist.

With these points in mind we are constantly attempting to improve our services to our membership and the NEWSLETTER is one of our means of service. We wish to publish more than a list of meeting notices and so you have noticed a variety of articles when space has permitted. Editorials are new – for you and for us, but it is not our intent to express a personal political view anywhere in the NEWSLETTER. However, we will in the future express views on items relative to the IEEE member and his environment and society. Views will be on topics such as pollution, SST, auto safety, unemployment, etc., and they will be supported by your Executive Committee.

Unfortunately, just as we are making the NEWSLETTER a more meaningful publication, our financial situation is hampering our efforts and we are forced to publish a four-page issue with a bare minimum of items. It is hoped that this situation will be alleviated and we can expand the features of our publication.

Improved membership services, including NEWSLETTER features, is one of our goals for the upcoming year. We have another goal which is much more mandatory and that is to get our Section finances away from the situation that has been eating up our surplus. Our financial picture has been marked by liberal spending on services for the membership and a very poor attendance at Section sponsored events, as well as drastic cuts in revenue from NEWSLETTER advertising. Other areas of more intense concentration will be increasing membership interest, more involvement with neighboring Sections and more communications with the students in our Section. This is a tall order but we must at least start in this direction if we are to exist as a useful organization for our membership. You can help by your interest and attendance at meetings.

Have a successful year and if you have any comments or questions please contact me or any of the other Section officers.

Robert G. Sokalski, Chairman

Newsletter

MEETINGS CALENDAR

Thursday, September 23
Electron Device Group Meeting–Recent Developments in Magnetic Bubble Technology, Dr. John A. Copeland, Speaker. ITT Laboratories, Nutley, N. J., 8:00 P.M. Pre-Meeting Dinner: Copperhood Restaurant, south of Route 3 at Park Ave. exit, 6:00 P.M.

Thursday, September 30
Tour of Owens-Illinois Glass Facilities. The Owens-Illinois Glass Plant, 2220 91st Street, North Bergen, N. J., just west of Rt. 1-9, approximately midway between Rt. 46 and Rt. 3, 7:30 P.M. Reservation required.

Wednesday, October 20
Multi-Group Chapter Meeting–Artificial Internal Organs, Dr. George Meyers, Speaker. A/S 141, County College of Morris, Route 10 & Center Grove Road, Randolph Township, N. J., Pre-Meeting Dinner: See October issue.

For Fall Lecture Series of North Jersey and New York Sections See Pages 5 through 11

Carver Mead of California Institute of Technology has projected the possibility of producing a computer at a cost of $25.00, using electron beam generated patterns. In large quantity production a $100.00 to $200.00 computer should be within reach.

The projected computer could carry out supplementary tasks: (1) station-keeping-using the curb, buried cable or distance to the car ahead, (2) communication to the computer in the approaching car in the event of erratic behavior or limited mode of operation in either car, (3) accepting communications from the road system describing some condition of weather, road, or traffic, (4) automotive system monitoring – oil pressure, water temperature, lights high with car approaching, battery charging, tire pressure, and possible diagnostic sound, temperature or stress pickups.

The sub-microsecond switching of integrated circuits is almost as important as the low cost potential. For a range resolution of a few feet, nano-second capabilities are required, at least for radar as the detector. Computer storage may replace the radar display.

IV. The Braking System – The coefficient of friction of the tire road interface may vary from about 1.0 on dry concrete or asphalt to 0.1 on oily, wet or iced roads. The distance to stopping varies directly as the square of the velocity and inversely with the decelerating forces. It is proposed here that an auxiliary emergency braking system provide, on demand, a constant "G" braking, independent of road surface. The higher "G" load the better, up to the capacity of belts and human endurance. Again alternatives exist: (1) retro-rockets, (2) explosive-driven anchors and (3) drag chutes.

The space programs have developed small rockets to a high degree. Two such rockets, slightly separated to provide turning torque if needed, could be mounted to fire forward, with an elevation of, say, 45 degrees. This would provide not only reverse thrust, but downward thrust increasing conventional braking.

Has it occurred to any reader that the engineering talent with the precise skills needed to man the multi-billion dollar development program to implement these techniques might be supplied by the currently unemployed aerospace engineers?

V. Supplementary Needs – The sensor, computer and improved braking system will require many minor technical supplements, including: (1) own speed input (2) own course input – (only a short term stability required), (3) computer to computer communications, (4) restraining device positive-fastening detector.

VI. The Cost – A development program to optimize and adapt current technology to work with all cars, roads, laws, etc., will cost at least several billion dollars. The total automotive installation cost therefore will vary from 40 billion to 100 billion dollars. Fixed installation will probably equal this. The total installation cost could vary from 100 billion to 200 billion dollars. Future technology may reduce these figures by substantial amounts. To the end, a more comprehensive development program may reduce ultimate costs by tens of billions of dollars, perhaps by an order of magnitude.

Balancing these costs are: (1) current annual insurance payments, 11×10^9, (2) estimated annual non-insured damages, 4×10^9, (3) estimated loss of annual G.N.P. due to injuries and deaths not covered by insurance, 10×10^9, (4) annual dollar value of lost time due to highway inefficiency, 15×10^9, estimated.

Another valid consideration towards the minimization of fatalities is the alternative of a mass transport system to supplement and eventually eliminate the car. This should, and indeed must, be accomplished, but as the mature engineer estimates the mass transit necessary to fill his needs of travel for work, shopping, medical care, leisure, etc., it will be apparent that mass transportation is several decades away. Couple to this the natural desire to have the freedom and convenience of a car and it is apparent that cars will exist in present quantities for many years.

VII. Implementation – Clearly this is not a program for which Detroit can foot the bill. A very large system-oriented company should be selected by competitive process to coordinate the many facets of this program. Subcontracts to universities and smaller companies are a necessity. The extent of government spending on automobiles should not exceed the original development program, 3 to 10 billion dollars. Fixed road installation costs must be borne by federal and state governments. The first step in a program of this magnitude and urgency is positive action by the federal government.

Artificial Internal Organs

Dr. George Meyers, Manager of the Biomedical Engineering Laboratory of the Riverside Research Institute, will be the principal speaker at the October meeting of the Multi-Group Chapter. His speech will emphasize both the physiological and engineering aspects of artificial internal organ design. A color movie will be shown to illustrate new work that is being done in this field.

Dr. Meyers is currently working as consultant for the Atomic Energy Commission. He is developing an isotope powered pacemaker (atomic pacemaker).

Time: Wednesday, October 20, 1971.
Place: A/S 141, County College of Morris, Route 10 & Center Grove Road, Randolph Township, N.J.
Pre-Dinner Meeting: See October issue.

A Voting Reminder!

Each year, only one third of the IEEE members vote for the National and Regional officers, possibly because most of the positions have only one candidate. This year, however, there are three candidates for Regional Director for your region–Region 1:

Haroun Mahrous–New York Section
Harold Goldberg–Boston Section
Richard Benoit–Mohawk Valley Section

A 100% vote would mean the real choice of the members. A 35% vote as in the past means only *12%* can pick your Director.

SO LET'S MAKE IT A REAL ELECTION BY ALL VOTING. VOTE ANY WAY YOU WANT. BUT *VOTE!*

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N. Y. Section, IEEE

Power and Industrial Div.

Metropolitan Section

ASME

EDUCATIONAL PROGRAM — FALL 1971

REVIEW STUDY GROUPS — FOR PROFESSIONAL ENGINEER EXAMINATIONS

This program is designed to prepare candidates for Professional Engineering License examinations in New York and New Jersey. The material is consistent with the national type of exam used for the New York license examinations. Candidates for Part I and Part II should enroll in Study Group No. 1, No. 2 and No. 3. The New York State Board permits graduates of approved schools to take Parts I and II and qualify for "Engineer-in-Training." New York exams will be held in December 1971 and April 1972. Please note that the fall course will be completed prior to the December exam.

ENDORSED BY NYSSPE

BASIC ENGINEERING SCIENCES I (IEEE-ASME) — **STUDY GROUP NO. 1**

Review for Part I and Part II, N. Y. Exam. Review will cover practical applications of Statics, Mechanics, and Mathematics.

MONDAYS, Starting August 30, 1971, 6:15-8:45 P.M., 12 Sessions
Auditorium, 19th Fl., Consolidated Edison Co., 4 Irving Place, N.Y.C.

Instructor: O. Ondra, P.E., Professor of Civil Engineering, Manhattan College

BASIC ENGINEERING SCIENCES II (ASME-IEEE) — **STUDY GROUP NO. 2**

Review for Part I and Part II, N. Y. Exam. Review will cover practical applications of Dynamics, Fluid Mechanics, Thermodynamics, and Electrical Principles.

TUESDAYS, Starting August 31, 1971, 6:30-9:00 P.M., 12 Sessions
Room 1701, Consolidated Edison Co., 4 Irving Place, N.Y.C.

Instructor: A. Paullow, P.E., Consolidated Edison Co.

ENGINEERING ECONOMICS AND PRACTICE (IEEE-ASME) — **STUDY GROUP NO. 3**

Review for Engineering Economics for all three sections of the exam. Review will cover economic comparisons, annual cost, present worth, and rate of return. Fixed and operating costs, accounting and cost analysis, depreciation, taxes, and valuations will also be reviewed.

THURSDAYS, Starting September 2, 1971, 6:15-8:45 P.M., 12 Sessions
Room 1425, Consolidated Edison Co., 4 Irving Place, N.Y.C.

Instructor: R. E. Mendoza, P.E., Public Service E. & G. of N. J.

MECHANICAL ENGINEERING (ASME) — **STUDY GROUP NO. 4**

Review for Mechanical Engineering Section of Part III, N. Y. Exam. Application of mechanical engineering principles to combustion, gas dynamics, compression shock, nozzle design, steam power plant cycles, psychrometrics, air conditioning heat transfer, nuclear reactors, Mach cone, Kinetics, gyroscope motion, vibratory motion, balancing of machines, compound shafts, design of gears, hydraulics, pumps and fans, stress and deformation of machine elements, etc.

WEDNESDAYS, Starting September 1, 1971, 6:30-8:30 P.M., 12 Sessions
Room 1701, Consolidated Edison Co., 4 Irving Place, N.Y.C.

Instructor: M. Kurtz, P.E.

ELECTRICAL ENGINEERING AND APPLICATIONS (IEEE) — **STUDY GROUP NO. 5**

Review for Electrical Engineering Section of Part III, N. Y. Exam. Electrical Engineering Principles and Applications of: transformers, a-c and d-c machines, transmission lines, filters, networks; impedance matching, bridges, coupled circuits, resonance, harmonics, transients, three-phase power, amplifiers, electronic circuits, Root locus and Root Criteria.

WEDNESDAYS, Starting September 1, 1971, 6:30-9:00 P.M., 12 Sessions
Room 1405, Consolidated Edison Co., 4 Irving Place, N.Y.C.

Instructors: L. E. Burnett, P.E., Consolidated Edison Co.; S. Sonsky, P.E., Queensborough Community College

REGISTRATION INFORMATION

GROUPS #	FEES	PAYABLE TO	MAIL TO
1,3	$30 Members, IEEE, ASME, NYSSPE $40 all others	"POWER & IND. GROUP N. Y. SECTION IEEE"	*I. M. Berger,* Vice Chairman Educational Committee, IEEE N.Y.C. Transit Authority, Rm. 1200 370 Jay St., Brooklyn, N. Y. 11201 Phone: (212) 852-5000, Ext. 4495
5	$50 Members, IEEE, ASME, NYSSPE $60 all others		
2, 4	$30 Members, IEEE, ASME, NYSSPE $40 all others	"ASME METROPOLITAN SECTION"	*Richard Maslow,* Educational Comm. ASME, Metropolitan Section N.Y.C. Health & Hospital Corp. Bureau of Engineering & Maintenance 66 Leonard St., N. Y., N. Y. 10013 Phone: (212) 566-6940
6, 7, 8, 9	$25 Members, IEEE, ASME, NYSSPE $35 all others	"POWER & IND. GROUP, N. Y. SECTION IEEE"	*J. Tambasco,* Vice Chairman Educational Committee, IEEE 217 78th Street Brooklyn, N. Y. 11209 Phone: (212) 264-4227
10	$30 Members, IEEE, ASME, NYSSPE $40 all others		

Fill out one registration form for each group and mail with payment

NEW YORK SECTION IEEE
POWER & INDUSTRIAL DIV.

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EDUCATIONAL PROGR

STUDY GROUP NO. 6
NUCLEAR POWER PLANT DESIGN & ENVIRONMENTAL CONTROL — PART III

MONDAYS, 6:30-8:30 P.M., Starting September 13, 1971

Union Carbide Building, 3rd Floor, 270 Park Avenue, N. Y., N. Y.

Group Sponsor: *E. N. Mercouris*
Tel. (212) 964-2614

Principal Instructor: *F. D. Hutchinson, P.E., Gibbs & Hill Inc.*

This series of lectures is a continuation of Parts I and II; however registration of persons who did not attend the previous parts is also encouraged.

The Nuclear Section and a portion of the Environmental Control will be presented by F. D. Hutchinson, while the balance of environmental control and plants are as shown.

Notes authored by E. N. Mercouris will be distributed at the beginning of each session to supplement the lectures.

1. **September 13 - Introduction** - Impact on the environmental baseline of power generation, pollution & heat disposal. Multiple Nuclear Power stations. Cooling towers & stacks.
   E. N. Mercouris, Gruzen & Partners

2. **September 20 - Reactor Control Parameter** - Thermal flux, neutron flux and reactivity.
   Speaker to be announced

3. **September 27 - Nuclear Power Plants** - Safeguards and environmental considerations.
   Speaker to be announced

4. **October 4 - Pressurized Water Reactors and PRODAC Computer Control.**
   Speaker to be announced

5. **October 18 - Thermal Pollution** - Heat disposal, waste heat utilization, cooling towers, power plant water treatment.
   Speaker from Aqua Chem

6. **November 1 - Boiling Water Reactors & Computer Control.**
   Speaker to be announced

7. **November 8 - Fuel Management & Economics.**
   Speaker from Union Carbide

8. **November 15 - Construction Management & Operation** - Stateside plant erection, scheduling, testing and start-up.
   F. D. Hutchinson, Asst. Chief Mech-Nuclear Eng. Gibbs & Hill, Inc.

9. **November 22 - Quality Assurance, Control & Tests.**
   Speaker to be announced

10. **November 29 - Reactor Types HTGR & LMFBR.**
    Speaker to be announced

11. **December 6 - Nuclear Power Plant Packaging** - Balance of plant component prefabrication on a moduli basis and barge shipment considerations.
    Speaker from Newport News Shipbuilding Co.

12. **December 13 - Air and Water Pollution & Monitoring Stations** - Instrumentation, circuitry fundamentals, measured design parameters and test interpretation.
    Gerald R. Goldgraben, President Ambient Systems Inc.

STUDY GROUP NO. 7
GROUNDING PRINCIPLES AND PRACTICES

TUESDAYS, 6:30-8:30 P.M., Starting September 14, 1971

Consolidated Edison Co., Room 1425, 4 Irving Place, New York, N. Y.

Group Coordinator: *Alex Korn, Stone & Webster Engrg.*
Tel. (212) 592-9300

Group Sponsor: *John F. Tambasco, Gen. Service Admin.*
Tel. (212) 264-4227

A review of the engineering practices and principles of system and equipment grounding. This will include the important elements in protection of transmission and distribution systems, code requirements, earth connection, cathodic protection and human safety.

1. **September 14 - Basic Principles** - Why ground? Fundamentals and methods of system grounding.
   R. H. Kaufmann, P.E., Kaufmann Engineering

2. **September 21 - System Grounding** - Fault current limitation (resistors, reactors, etc.) and relaying. Use of concrete enclosed reinforcing rods as ground electrodes.
   R. H. Lee, P.E., E. I. Du Pont

3. **October 5 - Substation Grounding** - Grounding of substation equipment and structures.
   George Paul, P.E., AEP

4. **October 12 - Distribution System Grounding** - Grounding neutral conductors, poles, and distribution equipment.
   J. A. MacDougall, LILCO

5. **October 19 - Transmission Line Grounding** - Grounding of transmission tower and shield wires. Lightning protection.
   R. W. Pashley, LILCO

6. **October 26 - Industrial Plant Grounding** - Delta and Wye systems, grounded and ungrounded.
   R. G. O'Sullivan, Burns & Roe

7. **November 9 - Grounding & the National Electrical Code** - Bonding of services and equipment grounding.
   E. C. Soares, P.E.

8. **November 16 - Cathodic Protection** - Nature of corrosion and protective circuits.
   W. F. Gundaker, P.E., Ebasco Services

9. **November 30 - Grounding Systems for Patient Care** - Electrical systems for hospitals.
   C. Tsung, Ph.D., Syska & Hennessy

10. **December 7 - Connection to Earth** - Characteristics of grounds, earth resistivity, calculations and tests.
    A. O. Lange, James G. Biddle Co.

LL GROUPS ARE OPEN TO THE PUBLIC

M — Special Study Groups FALL 1971

STUDY GROUP NO. 8
FUNDAMENTALS OF ELECTRICAL DESIGN – PART I
Practical Design Principles for Industrial and Commercial Building Low-Voltage Distribution Systems

WEDNESDAYS, 6:30-8:30 P.M., Starting September 15, 1971

Consolidated Edison Co., Room 1425, 4 Irving Place, New York, N. Y.

Group Coordinator: *H. Dougherty, H. O. Penn Machinery*
Tel. (212) 895-5400
J. Domorski, Automatic Switch
Tel. (212) 344-3765

The first of a series of ten-session study courses to help electrical, consulting and project engineers, contractors, architects and others who are concerned with power distribution systems. The low-voltage system will be stressed since, in the average industrial and commercial power system, about ninety-five per cent of all design problems involve the selection and application of low-voltage protective and distribution equipment.

Part I, the foundation for the series, will cover basics of short-circuit behavior and calculations, fuse and circuit breaker characteristics including typical application problems. Succeeding courses will build on this material and cover development of the one-line diagram, switchgear and switchboards, service entrance requirements, motor control centers, ground-fault protection, etc.

Part I sessions will be presented by H. W. Reichenstein, Senior Marine Terminals Engineer, The Port of New York Authority. Notes will also be provided for the lectures.

1. **September 15 - Short Circuit Basics** - Preview of material to be covered. What is a short-circuit. Causes of faults. Effects if uncontrolled. Significance of equipment interrupting ratings. Sources and magnitudes of short-circuits.
2. **September 22 - Short Circuit Basics** - Symmetrical and asymmetrical currents. Analysis of short circuit wave forms. AC component. DC component. X/R ratio and its effect on asymmetry. 3-phase bolted faults, line-to-line bolted faults, line-to-ground bolted faults, arcing faults.
3. **October 6 - Short Circuit Calculations - Introduction.** One-line diagram. Deciding fault locations. Impedance diagram. Impedance data and how to use it. Motor contribution to fault.
4. **October 20 - Short Circuit Calculations** - Per-unit impedance calculation method, ohms-per-phase calculation method, short-cut calculations using estimating tables, curves and rule-of-thumb methods.
5. **November 3 - Short Circuit Calculations** - Two typical distribution systems calculated in detail.
6. **November 10 - Low Voltage Fuses** - UL and NEMA standards. Classes of fuses. One-time and dual-element fuses. Interrupting ratings. Test requirements. Time-current characteristic curves. Current limitation concept. Peak let-through curve data. I^2t let-through concept and data.
7. **November 17 - Low Voltage Fuses** - Fuse-to-fuse coordination. Typical fuse application examples.
8. **November 24 - Low Voltage Circuit Breakers** - Molded case breakers. Low-voltage power breakers. Integral Test requirements. Molded case breaker time current characteristic curves adjustable instantaneous trip units. Typical molded case breaker applications.
9. **December 1 - Low Voltage Circuit Breakers** - Low voltage power breaker time-current characteristic curves. A, B and C long-time delay trip units. Combinations of long-time delay, instantaneous and short-time delay trip units. Typical low-voltage power breaker applications.
10. **December 8 - Low Voltage Circuit Breakers** - Coordinating circuit breakers with fuses. Factors to consider in coordination studies. Complete selective coordination seldom attained in a distribution system. Application examples.

STUDY GROUP NO. 9
APPLICATION OF GAS TURBINE GENERATOR UNITS

THURSDAYS, 6:30-8:30 P.M., Starting September 16, 1971

Consolidated Edison Co., Room 1701, 4 Irving Place, New York, N. Y.

Group Coordinator: *J. Buchsbaum, Con Edison*
Tel. (212) 460-4998
W. Laib, Con Edison
Tel. (212) 460-4295
Group Sponsor: *E. Fabri, Con Edison*
Tel. (212) 460-6072

This course will cover design and application problems of gas turbine generator units. Industrial and utility system requirements and practical operational problems will be presented. A field trip will be organized to inspect operation of a gas turbine installation (by Curtiss-Wright Corp.).

1. **September 16 - Application of Gas Turbine Generator Units on Industrial and Utility Systems** - System requirements, economic evaluation, peaking, emergency supply, startup problems.
   Speaker from Ebasco Services
2. **September 23 - Electrical System of Gas Turbine Plant** - Selection of voltage, generators, excitation system, switchgear.
   Speaker from Electric Machinery Co.
3. **September 30 - Gas Turbine Plant Design - I** - Standard design. Use of jet turbines. Fundamental thermal and mechanical problems.
   Speaker from Turbine Power & Marine Co.
4. **October 7 - Gas Turbine Plant Design - II** - Standard design. Use of industrial type turbines. Fundamental thermal and mechanical problems.
   Speaker from Westinghouse Corp.
5. **October 14 - Installation of Gas Turbine Units** - Construction problems. Maintenance problems.
   Speaker from Worthington Corp.
6. **October 21 - Auxiliary Power Supply for Gas Turbine Units** - Selection of voltage. Auxiliary motors. Motor starters. Transfer switches.
   Speaker to be announced
7. **October 28 - Use of Minicomputers for Gas Turbine Plants** - Requirements. Control functions. Alarm functions. Recording functions.
   Speaker from Westinghouse Corp.
8. **November 4 - Control and Instrumentation System** - Requirements. Control systems. Automatic startup and shutdown circuits. Supervisory control. Metering requirements.
   Speaker from Turbine Power & Marine Co.
9. **November 11 - Protective Relaying and Operational Problems** - Standard protective relaying. Requirements. Operational problems. Voltage regulation. Megavar supply. Method of effective grounding.
   Speaker to be announced
10. **November 18 - Future Developments** - Future trend - combined cycle system. Special installations.
    Speaker to be announced

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N. Y. Section, IEEE
Power and Industrial Div.

EDUCATIONAL PROGRAM — FALL 1971
Special Study Group

Metropolitan Section
ASME

STUDY GROUP NO. 10

MONEY MANAGEMENT FOR ENGINEERS

TUESDAYS, 6:30-8:30 P.M., Starting September 14, 1971

Union Carbide Building, 3rd Floor
270 Park Avenue, New York, N. Y.

Group Coordinator: *A. F. Cox, Bussmann Mfg.*
Tel. (212) 267-1466
Jalal Gohari, AEP
Tel. (212) 422-4800, Ext. 551

Instructor: *R. E. Mendoza, P.E.*
Public Service E. & G. of N. J.

The study group provides individual improvement to those who are interested or involved in lending or borrowing money, mortgages, credit, stock investments and bond valuations. It is geared for engineers involved in making management decisions affecting the expenditure of company funds. It provides the mathematics for economic analysis (a prerequisite for engineering economy studies).

The purpose of the Money Management Study Group is to develop an understanding of the time cost of money by developing a fundamental knowledge of financial mathematics.

The study group is based on a workshop series of problems related to many common financial situations and the practical application of financial tables to solve these problems.

Text Material: *Money Management Workshop Problems* by Robert E. Mendoza, P.E.; and *Compound & Annuity Tables* by Frederick C. Kent and Maude E. Kent (McGraw-Hill).

1. **September 14 - Purpose of a Money Management Course** - Meaning and Definition of Interest. Equivalence. Financial Tables.

2. **September 21 - The Magic of Compounding** - The "Series Compound Amount" Formula. Use of Compound Amount Tables. Problems Concerning Growth of Money with Interest.

3. **September 28 - More Magic of Compounding** - The "Series Compound Amount" Formula. Use of Series Compound Amount Tables. Problems Concerning Growth of Periodic Deposits of Money with Interest.

4. **October 5 - Partial Payment Plans** - The Partial Payment (Capital Recovery) Formula. Use of Partial Payment Tables (Capital Recovery). Problems Concerning Payment of Debts.

5. **October 12 - Additional Problems Concerning Growth of Money and Payment of Debts.**

6. **October 19 - The Present Value (Worth) of a Future Payment** - Derivation of "Present Worth" Formula. Use of Present Worth Tables. Problems Concerning the Present Value (Worth) of a Future Payment.

7. **October 26 - Discussion of the Present Value (Worth) of a Series of Future Payments** - Derivation of "Series Present Worth" Formula. Use of Series Present Worth Tables. Problems Concerning the Present Value Worth of a Series of Future Payments.

8. **November 9 - Amount of Deposits to Build to a Certain Sum (Sinking Funds)** - The "Sinking Fund" Formula. Use of Sinking Fund Tables. Problems Concerning Deposits to Build to a Certain Sum (Sinking Fund).

9. **November 16 - Discussion of Bonds** - Problems Concerning Bonds.

10. **November 23 - Unfinished Problems and Review.**

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Date ..... By .....

Note: See Registration Information for Checks

IEEE NORTH JERSEY SECTION LECTURE SERIES–FALL, 1971

Engineering Economics

This eight-session study group aims at providing the student with the skills that will enable him to solve many of the daily economic problems that confront him in business and at home. The Minimum Revenue Requirement Discipline will be the technique used to measure the profitability of a venture as well as the relative economy of alternative proposals. Topics to be discussed include Cost of Money, Financial Mathematics, Depreciation and Income Taxes. Engineering, Finance, and Accounting personnel should find the presentation thought-provoking.

The instructing staff will be headed by Mr. Bert J. Blewitt, Engineering Economist of the System Planning and Development Department, Public Service Electric and Gas Company, Newark, New Jersey.

September 29 – THE MINIMUM REVENUE REQUIREMENT DISCIPLINE
Introduce concept of MRRD and Minimum Acceptable Return (MAR=Cost of Capital). Discuss the importance of engineering economics and how to find the proper discount rate (MAR) to use in economic studies.

October 6 – FINANCIAL MATHEMATICS
Show how money is time related. Develop the six basic time equivalencies allowing money to be changed into single amount or annual amounts over any period of time.

October 13 – RETURN AND DEPRECIATION
Year-by-year or lifetime-levelized amounts. Discuss the importance of these first two MRRD elements. Discuss various depreciation methods and how they affect income of the firm. Calculate Capital Recovery Costs.

October 20 – TAXES: INCOME AND AD VALOREM
Discuss the silent partner in your company – government. Show how these MRRD elements are affected by life estimates, dispersions, and retirements.

October 27 – OTHER CONSIDERATIONS IN ECONOMIC STUDIES
Concludes the study of MRRD elements: Operation and Maintenance, Insurance, Non-recurring Expenses, and Revenue Taxes.

November 3 – PRACTICAL PROBLEMS AND THEIR SOLUTIONS
Uses the MRRD to solve typical problems such as "repair or replace," "capitalize or expense," "permanent installation versus temporary installation."

November 10 – GENERAL PROCEDURES AND PRESENTATION
How to present your study to management in a meaningful manner. Review of MRRD method of economic analysis.

November 17 – STUDENTS' CHOICE!
You get the opportunity to choose an area of interest to be discussed.

TIME: 7:00-9:00 P.M., Wednesday evenings starting September 29, 1971.

PLACE: MULTI-AMP Institute, 61 Myrtle Street, Cranford, N. J. 07016

FEE: $40.00 for Members of IEEE, ASME, NJSSPE, etc.; $50.00 for Non-Members. A $5.00 discount for early registration applied to both applications if received prior to September 15, 1971.

COORDINATOR: For any information concerning course or location, contact: C. K. Blizard, MULTI-AMP Corporation, 61 Myrtle Street, Cranford, N. J. 07016, (201) 276-8200.

REGISTRATION FORM – ENGINEERING ECONOMICS

Send to: Mr. Charles K. Blizard, MULTI-AMP Institute, 61 Myrtle Street, Cranford, N.J. 07016; Phone: (201) 276-8200

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Check or Money Order Enclosed: ☐ Member: $35.00 ☐ $40 after September 15
☐ Non-Member: $45.00 ☐ $50 after September 15

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IEEE Forms New Group

The IEEE is forming a new Group on Manufacturing Technology. The new Group has been assigned an internal code number of G-35 and the Group abbreviation of G-Mfg T. General field of interest of the new Group will be all aspects of manufacturing technology as it relates to the manufacturing of electrical and electronic equipment. With the advent of more sophisticated production lines using computers and numerical control techniques, the electrical engineer is playing an ever increasing role in modern manufacturing technology. This is the reason the new Group was originated. It was not conceived to duplicate efforts in solving the detailed, specialized, manufacturing problems covered by other Groups, but to cut across all the present Group activities to establish and work in those areas common to basic modern manufacturing systems. IEEE members should contact the Technical Activities office at IEEE headquarters for more information.

STUDENT AFFAIRS

A new Bachelor of Technology degree program was recently announced by Newark College of Engineering.

The program provides an opportunity for further education to persons who have completed the Associate degree, or its equivalent, in Engineering Technology at a community college, technical institute, or similar institution. The program can be completed in four years of part-time evening study and hence is available to the technician employed full time in industry.

The program provides advanced education in technical and management skills, together with selected humanities and social science electives. A Core Curriculum is required of all students; and specialization in Electrical, Industrial or Mechanical Systems is provided by inclusion of an Option Course in every semester.

The Engineering Technician

The engineering technician has traditionally worked in a supporting role to the engineer. At one time the formal education of the technician did not go beyond an Associate degree, but in the last decade a strong trend toward further education has become evident nationally. The increasing complexity of technological problems has required a substantially higher level of sophistication by the modern engineer in industry; and engineering curriculums have become more mathematics and science-based. As a result, some of the more practical work of the engineer has been delegated to the technician, who then finds himself in need of further education to cope with his new assignments. The trend toward further education has led to the establishment of baccalaureate programs in technology and to a new occupational identity, the technologist.

The Technologist

The technologist works closely with the technician and the engineer in the solution of industrial problems. It has been said that the four-year technologist resembles the engineer of two generations ago in his practical approach to the solution of every day problems. Persons who complete the Bachelor of Technology program at NCE will be prepared for careers in technical design, production, management, technical sales, applications engineering and field service.

The new programs are headed by Dr. Irving Engelson, Assistant Dean for Engineering Technology. Dean Engelson, who holds a Ph.D. in electrical engineering, has spent many years in technology education and started his career as an engineering technology graduate. He feels that by providing Bachelor of Technology graduates with a practical feel for the relationship between mathematical topics such as differential equations, statistics, etc., on the one hand and physical systems and "gadgeteering" on the other, Newark College of Engineering is filling a long felt void in the educational spectrum.

Core Curriculum

The Core Curriculum, required of all students, includes courses in mathematical analysis, computer programming, technical communications and industrial cost analysis. Other required courses in the Core Curriculum include humanities and social science, management and organizational behavior, labor-management relations and others, such as supervision and employee relations.

Electrical Systems Option

In order to specialize in Electrical Engineering Technology, students have to take the Electrical Systems Option.

The Electrical Systems option is designed as a continuation of an Associate degree program in electrical or electronics technology, with emphasis on the theory and application of electrical circuits. Electives provide specialization in communications, power generation and distribution, electrical machines, and other fields.

However, regardless of the specialization electives, all students are required to take courses in Circuit Analysis, Circuits Measurements, Discrete and Integrated Circuits and Instrumentation and Controls. In the last semester all students must complete an electrical systems project in which each student will construct and analyze a project of his own choice. The project may be of the small equipment design or measurement system type.

Industrial Systems Option

Another educational path available to the Associate degree holder in electrical engineering technology is the Industrial Systems Option, which is the technologist's equivalent to industrial engineering.

The Industrial Systems option is a broad program emphasizing the quantitative methods of production management. It prepares the holder of an Associate degree in any field of engineering technology for work in quality control, work measurement, reliability cost analysis, plant layout, materials handling, and supervision. In this option students are required to take courses in product and process design, quantitative management methods, industrial statistics and others. There is also a Mechanical Systems Option with an emphasis on design. This option would normally be taken by people with an Associate degree in mechanical engineering technology.

Although thousands of Bachelor of Technology degrees are awarded in the United States every year, the degree is relatively new in the east. As more B.T. holders become available, industry will have to define the role of the technologist in their organizational structure. The need for practical-minded yet well-educated technical people existed since the apparent disappearance of the hardware-oriented engineer of yesteryear. The technologist will probably fill the gap and take his place; and NCE will have made another important contribution to the educational and industrial sectors of society.

Further information about the Bachelor of Technology programs can be obtained by writing to Dr. Irving Engelson, Assistant Dean for Engineering Technology, at Newark College of Engineering, 323 High Street, Newark, N. J. 07102.