September 17, 1945

TO: ALL TECHNICAL PERSONNEL

SUBJECT: CATALOG OF COURSES

REGISTRATION

PLEASE NOTE CHANGED HOURS AND LOCATIONS. Registration will
be held from Tuesday, September 18 to Friday, September 21
inclusive. The hours will be from 8:30 to 11:30 a.m. and
from 2:30 to 5:30 p.m. in Room E-210. There will also be
registration facilities in the High School from 7:00 to 9:00
p.m. in order to make registration possible for persons not
employed in the Tech Area.

COURSES

UNDERGRADUATE - JUNIOR-SENIOR LEVEL

CHEMISTRY

11. Elementary Organic Chemistry.

Lecturer: M. F. Roy

Hours: Section I.   Tues. & Fri. 10:30 - 11:45 a.m.
                     Sigma 47
        Section II. Mon. 7:15 - 8:30 p.m. Gamma 49
                     Thurs. 8:45 - 10:00 p.m. Gamma 49

Prerequisite: Elementary Chemistry

Textbook: None

Description of Course: Study of the major general classes
of organic compounds, their properties, reactions, and uses.

12. Elementary Physical Chemistry.

Lecturer: I. B. Johns

Hours: Wed. & Fri. 4:15 - 5:30 p.m. in Gamma 49

Prerequisites: Elementary Chemistry Calculus;
                Elementary Physics desirable.

Textbook: Getman-Daniels "Outlines of Theoretical
           Chemistry". (Required. Price $3.50)

Description of Course: This course will give the student
a working knowledge of the fundamental principles of
physical chemistry, including the study of gases, liquids,
solids, the principles of thermodynamics, the theory of solu-
tions, thermochemistry and its applications, the treatment
of equilibria - both homogeneous and heterogeneous,
chemical kinetics, electrolytic theory.

13. Advanced Physical Chemistry

Unfortunately, it has been impossible to secure a lecturer
for this course. It will, therefore, not be given.

METALLURGY

21. Physical Metallurgy

Lecturer: George L. Kehl

Hours: 10:30 - 11:45 a.m. Mon. & Wed. in Sigma 47
Prerequisites: Elem.Chem., one semester of Elem. Physics
Textbooks: (Recommended)
"The Alloying Elements in Steel" - E.C.Bain
"Engineering Physical Metallurgy" - R.H.Heyer
"Principles of Physical Metallurgy" - F.L.Coonan
"Principles of Physical Metallurgy" - G.E.Doan & B. Mahla
"The Science of Metals" - Z.Jeffries & R.S.Archer
"Principles of Metallography" - R.O.Homerberg & R.S.Williams
"Structure and Properties of Alloys" - R.M.Brick &
                                        A. Phillips

Description of Course: State of Aggregation; origin of
metallic structures; crystal structure; equilibrium dia-
grams of metallic systems and their interpretation; non-
equilibrium conditions in metallic systems; plastic
deformation and annealing; non-ferrous metals and alloys;
iron and steel; basic concepts of the heat treatment of
steel.

PHYSICS

31. Electricity and Magnetism

Lecturer: R. Brode

Hours: Mon. & Wed. 10:30 - 11:45 a.m. in Gamma 49

Prerequisites: Sophomore Physics, Calculus

Textbook: Probably Page & Adams   2

Description of Course: Detailed discussion of the
properties of electrostatic and magnetostatic fields.
Electric currents and their magnetic fields, alternating
currents. inductance and capacitance, oscillating circuits
electric waves.

32. Modern Physics

Lecturers: B. Rossi and L. Parratt

CLASSIFICATION CANCELLED
PER DOC REVIEW JAN. 1973

Hours: Section I: Wed. & Fri. 9:00 - 10:15 a.m. Rm.B-223
        Section II:Mon. 8:45 - 10:00 p.m. Rm. B-223
                Thurs. 7:15 - 8:30 p.m. Rm. B-223

Prerequisites: Freshman & Sophomore Physics, Calculus.
                A course in Electricity & Magnetism is
                desirable.
 Textbook: "Introduction to Modern Physics"-Richmeyer & Kennard 6
Description of Course: The experimental and theoretical
development which leads to the present concept of the con-
stitution of matter. Beginning with the discovery of the
electron, the course will discuss various methods of deter-
mining Avogadro's number, the structure of atoms, the
atomic nucleus and cosmic radiation.

SECRET

33. Electronics

Lecturer: D.K. Froman and Elmore

Hours: Section I: Tues & Fri. 10:30 - 11:45 a.m. Gamma 49
         Section II: Mon. 7:15 - 8:30 p.m. Rm.B-223
                     Thurs. 8:45 - 10:00 p.m. Rm. B-223

Prerequisites: Differential & Integral Calculus. General
                College Physics. A course in Electricity
                and Magnetism (Physics) or a course in
                Alternating Currents (Engineering)

Textbook: Reich "Theory and Applications of Electron   6
          Tubes" (Recommended.)

Description of Course: Electric Circuits: fundamental
laws and their application to complex circuits for D.C.,
sinusoidal A.C., and transient currents. Electron Tubes:
parts and their functions; static and dynamic characteristics
and their measurement; special tubes; some basic circuits.
Electronic Circuits Design: detailed parts specification;
applications to simple but complete electronics circuits.
Basic Electronic Circuit Elements and Complete Circuits:
emphasis on circuits for industrial control and scientific
measurements rather than on radio, television, and radar.

34. Micro-Waves

Unfortunately the offering of this course at the present
time seems to present insuperable difficulties generally
connected with the confidential character of some of the
information. It is hoped to give this course in the
following semester if the courses are continued at that
time.

MATHEMATICS

41. Differential Calculus

Lecturer: P. Whitman

Hours: Wed. & Fri. 8:30 - 10:15 a.m. Gamma 49

Prerequisites: Analytic Geometry; Trigonometry.

Textbook: Granville, Smith & Longley "Elements of the   6
           Differential & Integral Calculus" (Required)

Description of Course: Differentiation of algebraic and
transcendental functions; applications to slopes, maxima
and minima rates, etc.; higher derivatives; differentials
and applications to small errors, etc.; integration of
standard elementary forms and application to simple areas,
only if four hour course.

42. Differential Equations

Lecturer: J. W. Calkin & D. A. Flanders

Hours: Section I: Tues & Thurs. 9:00 - 10:15 a.m.Gamma 49
        Section II:Wed & Fri. 7:45 - 9:00 p.m. Gamma 49

42. Differential Equations

Lecturer: J. W. Calkin

Hours: Section I: Tues & Thurs 9:00 - 10:15 a.m. Gamma 49
         Section II:Wed & Fri. 7:45 - 9:00 p.m. Gamma 49

Prerequisites: One year of calculus

·Textbook: "Differential Equations"-H.T H Piaggio   6
           (Required.)

Description of Course: Ordinary differenti l equations of
the first order linear equations miscellaneous special
equations existence theorems numerical methods of
solution. solution in series selected topics in partial
differential equations.

                        GRADUATE

CHEMISTRY

61. Thermodynamics

Lecturer: G. B.Kistiakowsky and E.R.Van Artsdalen

Hours: Section I: Wed. & Fri. 9:00 - 10:15 a.m. Sigma 47
       Section II: Mon 8:45 - 10:00 p.m. Gamma 49
                  Thurs 7:15 - 8:30 p.m. Gamma 49

Prerequisites: 1 yr. college calculus; 1 yr. college
Physics and the elementary chemistry up to and including
1 yr. in Physical Chemistry

Textbook: "Thermodynamics" - Steiner. (Recommended)   6

Description of Course: This is a course in chemical
thermodynamics and because of time limitations it will
not deal with topics of largely engineering interest
(heat flow, heat engines, etc.) or of interest exclusively
to physicists (such as the theory of thermo-electricity
etc.) The meaning of the three "laws of thermodynamics"
will be discussed and they will be applied to the cal-
culations of homogenous and heterogeneous chemical
equilibria vapor-solid equilibria ideal and non-ideal
solutions. surface tension etc. The interpretation of
the "Third Law" in statistical terms will be briefly
discussed and the problem of the calculation of absolute
entropies and of Free Energies of substances gone into in
detail. The approach toall these problems will be of
the type used by Gibbs (rather than the elementary
approach as used by Lewis and Randall in their book, for
instance) and hence these taking the course are expected
to be familiar with differential and integral calculus,
including partial differentiation. Otherwise the pre-
requisite is a course in elementary physical chemistry.

62. Radio Chemistry

Lecturer: J. W. Kennedy

Hours: Wed & Fri 4:15 - 5:30 p.m. Rm. B-223

Prerequisite: B.S.Degree in Chemistry or equivalent; or
by special arrangement.

Textbook: None. Some reference books recommended in-
cluding & Davidson

Description of Course: Natural radioelements. radioactive
decay, nuclear transmutation, accelerating devices.
radiations from radioactive substances detection tech-
niques, the study of radio-isotopes, new elements,
chemical behavior at very low concentrations, carriers,
tracers, exchange reactions, biochemical studies and
other applications.

63. Theoretical Organic Chemistry

Lecturer: Mr. Lipkin

Hours: Mon. 9:00 - 10:15 a.m. Rm. 3-223
        Thurs. 10:30 - 11:45 a.m. Rm. 3-223

Prerequisite: 1 yr. Elementary Organic Chemistry
              1 yr. Elementary Physical Chemistry

Textbook: "Theory of Organic Chemistry"- Branch & Calvin   4
            (Recommended.)

Description of Course: Electronic structure of organic
compounds; effect of resonance on the properties of or-
ganic systems; the relationship between physical pro-
perties and the structure of organic compounds.

PHYSICS

71. Theoretical Mechanics

Lecturer: ~~Cmdr. Bradbury~~ MR KELLER

Hours: Mon. 9:00 - 10:15 a.m. Sigma 47
       Thurs. 10:30 - 11:45 a.m. Sigma 47

Prerequisites: A.B.Degree in Physics, or equivalent
amount of undergraduate Physics; Differential Equations

Textbook: "~~Introduction to Theoretical Physics~~ ~~Slater~~   4
            ~~Frank (Recommended)~~
            WHITAKER ANALYTICAL DYNAMICS
Description of Course: A course in the dynamics of par-
ticles, rigid bodies. elastic media, and fluids. Topics
to be taken up will include vector analysis; particle
dynamics; Lagrange's equations; Hamilton's equations;
rigid body dynamics; vibrating systems; coupled systems
and normal coordinates; dissipative systems; elastic
media and hydrodynamics.

72. Electro-Magnetic Theory

Lecturer : H. A. Bethe

Hours: Tues & Fri. 10:30 - 11:45 a.m. Rm. B-223

Prerequisite: Calculus, Differential Equations, and an
undergraduate course in Electricity and Magnetism, or its
equivalent.
 Textbook: Abraham & Becker (Recommended.)   6
Description of Course: The course will start by setting
down and explaining Maxwell's equations. Various pheno-
mena will be derived from these equations; a relatively
short time will be devoted to electro-statics, an ex-
tensive treatment will be given of stationary currents
and their magnetic fields and of high frequency electro-
magnetic waves. Electromagnetic cavity resonators and

wave guides will be discussed. Relativity electrodynamics
will conclude the course.

73. Statistical Mechanics

Lecturer: L. I. Schiff

Hours: Mon. 9:00 - 10:15 a.m. Gamma 49
        Thurs. 10:30 - 11:45 a.m. Gamma 49

Prerequisite: Theoretical Mechanics and Modern Physics
               Quantum Mechanics desirable.

Textbook: "Statistical Mechanics" - Tolman (Recommended)   3

Description of Course: First Part, General Theory (8 to
10 weeks.) Introduction; classical statistical mechanics;
detailed balance and the H-theorem; quantum statistical
mechanics. Second Part, Application (6 to 8 weeks). (It
will probably be possible to discuss briefly 3 or 4 of
the topics listed below; these will be selected in con-
sultation between students and instructor.) Free electron
theory of metals; specific heats; electromagnetic
radiation; fluctuations; imperfect gases; atomic nuclei;
cooperative phenomena; equilibria in gases; reaction
rates in gases.

74. Elementary Quantum Mechanics

Lecturer: E. Teller

Hours: Mon & Wed 10:30 - 11:45 a.m. Rm. B-223

Prerequisite: Theoretical Mechanics; Electromagnetic
Theory, Differential Equations

Textbook: None for the time being.

Description of Course: A systematic description of the
laws of quantum mechanics and their relation to classical
physics. Specific topics to be discussed: correspondence
principle, wave-particle dualism uncertainty principle,
Schrodinger- and matrix-formulation of quantum mechanics,
the electron spin.

75. Nuclear Physics

Lecturer: Manley and Weisskopf

Hours: Tues & Thurs 9:00 - 10:15 a.m. Rm. B-223 (Section I)
        Wed. & Fri. 7:45 - 9:00 p.m. Rm. B-223 (Section II)

Prerequisites: One semester Quantum Mechanics; Modern
Physics (Atomic Spectra, Structure Elementary Particles.)

Textbook: None

Description of Course:1.Elementary particles and pro-
perties; 2a. Systematics of Nuclear Structure; nuclear
reactions; alpha decay; fission. 2b. Observational
methods. 3. Deuteron system p-n scattering. 4.Theory
of beta and gamma decay. 5. Theory of nuclear reactions.

76. Neutron Physics

Lecturer: E. Fermi

Hours: Tues & Thurs 9:00 - 10:15 a.m.   Sigma 47

Prerequisites: Differential equations; introduction to
theoretical physics; a knowledge of the elements of
Nuclear Physics; Introduction to Quantum Mechanics
desirable.

Textbook: None

Description of Course: Neutron sources (radioactive
sources, accelerating machines, piles) (1). Neutron
reactions (capture, scattering, etc..) (6). Neutron
detection (fast detectors - radioactive detection,
counters, fission counters, etc..) (3). Slow neutrons
(include diffusion theory, velocity selector) (6).
Fission by neutrons, Chain reaction (2). Slow neutron
piles (10). Fast neutron chain reactions (6).

77. Hydrodynamics

Lecturer: R. E. Peierls

Hours: Wed. & Fri. 4:15 - 5:30 p.m. Sigma 47

Prerequisite: Theoretical Mechanics, Differential
Equations.

Textbook: LA-165

Description of Course: **Kinematics of continuous medium.**
Lagrange and Euler variables, equation of continuity;
Hydrostatics, Stresses, Definition of ideal fluid; Euler's
equation; Bernoulli's theorem. Conservation laws.
Vorticity; Thomson's theorem; Irrotational flow.
Potential theory; Method of images; Complex variable;
Flow around sphere and cylinder; Mapping; Flow around
a corner; Airfoil theory; Application to free surfaces;
Vortices. Viscosity; Equation for viscous flow;
Poiseuille formula, flow between plates; Stokes law;
Turbulence; Laws of similarity; Reynolds number; Examples
of critical Reynolds numbers; Resistance coefficient;
Boundary layers; Heat transfer; Theories of turbulence.
Compressible fluids; Sound waves; Sound waves in medium
of varying properties. Supersonic flow; Mach angle;
Characteristics; Short waves; Hugoniot conditions;
Rayleigh-Taylor theory. Interaction of short waves.