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ABSTRACT

This publication contains detailed descriptions of nuclear programs and facilities of 182 four-year educational institutions. Instead of chapters, the contents are presented in five tables. Table I presents the degrees, graduate appointments, special facilities and programs of the institutions. The institutions are arranged in alphabetical order and summaries of their programs and facilities are presented for each. Table II presents the facilities equipment and courses for each institution. This table gives information about: (1) reactors; (2) accelerators; (3) analyzing equipment; (4) radiation sources; (5) computers; and (6) nuclear courses available. The third table lists, by state, the technician training institutions offering technology programs in nuclear science. The fourth table lists the National Laboratories. The final table lists the university associations giving addresses and member institutions for each association. This fifth edition was prepared to provide information to industries and institutions about nuclear science and engineering education programs and facilities. (MR)

EDUCATIONAL PROGRAMS AND FACILITIES in nuclear science and engineering

Fifth Edition
February 1975

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PREFACE

This fifth edition of *Educational Programs and Facilities in Nuclear Science and Engineering* contains detailed descriptions of nuclear programs and facilities of 182 four-year educational institutions. In addition, the names and addresses of 79 technician training institutions and the nuclear and nuclear-related programs which they offer are included. This edition was prepared at the behest of the Division of Biomedical and Environmental Research to provide a source of guidance to the many industries and institutions requesting information. Thus, it is hoped this booklet will serve the needs of the academic community, government, and industry in this specialized field.

Philip L. Johnson
Executive Director

INTRODUCTION

Oak Ridge Associated Universities, a prime contractor to the Energy Research and Development Administration, has compiled this summary of the programs and facilities of schools which offer education in nuclear science and engineering, and nuclear or nuclear-related technologies. A general requirement for inclusion in the listing of four-year institutions was that a school must offer at least four courses in nuclear or nuclear-related topics including quantum mechanics. However, schools which did not fully meet that course requirement were included if they specified the availability of a nuclear option in consort with other institutions.

The information in Tables I and II was compiled, principally, from completed questionnaires received in the spring of 1972 and returned to the responding schools for updating in the fall of 1973. In some cases, the number of degrees granted in nuclear fields was not brought forward from 1970 to 1973. With no indication to the contrary, it was assumed that a degree available in 1970 was, also, available in 1973, and is so indicated by the symbol "X" in the tabulation of degrees in nuclear fields. The information on the size of student body as of the fall of 1972, highest degree offered, and the general nature of each school was obtained from the 1973-74 edition of the Education Directory published by the U. S. Department of Health, Education, and Welfare.

Table III is a listing, by states, of 79 schools which represent themselves as offering two-year, and in some cases, four-year technician training programs in one or more of the following technologies: nuclear, nuclear engineering, nuclear medicine, nucleonics, radiation, radiologic, and radiological monitoring. There was not opportunity to obtain detailed descriptions of programs and facilities directly from these schools, so only their names, addresses, and training program titles are listed in this edition. The information in Table III was compiled, primarily, from the 1973-74 edition of *Technician Education Handbook* published by Prakken Publications, Inc., of Ann Arbor, Michigan.

Names and locations of the Energy Research and Development Administration Laboratories are given in Table IV.

Table V is a listing of university associations which are concerned with education and research in the basic, applied, medical, and engineering sciences with particular interest in nuclear applications and developments. Such associations provide for organized cooperation between their member institutions and the National Laboratories so that students and faculties may have access to National Laboratory facilities and participate in joint research programs of those laboratories. The use of National Laboratory facilities and research participation are not, however, limited to the members of the university associations.

Additional information is provided in the chapter entitled *Educational Assistance Activities*, beginning on page 69.

Table I

DEGREES, GRADUATE APPOINTMENTS, SPECIAL FACILITIES, AND PROGRAMS

KEY: A – Bionucleonics; B – Biology; C – Chemistry; D – Dependent Allowance; E – Engineering; F – Fees; M – Maximum; N – Nuclear Engineering; P – Physics; T – Tuition; V – Variable; X – Available, but no number supplied

ALABAMA, UNIVERSITY OF

Birmingham, Ala. 35294 (8,489 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X
Health Physics	X	–	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	1	3-6 hr	100%	4800/12
Teaching assistant	3-6	3-6 hr	100%	4000/12

Special Facilities and Programs: Experimental beta- and gamma-ray spectroscopy are areas of interest as well as active participation in programs in nuclear medicine for instrument development and evaluation and programs in therapeutic radiology for study and development of new modalities for cancer radiation therapy. An active program of theoretical studies of nuclear reactions, especially deuteron stripping reactions, has been established. A program leading to a BS in Physics with Health Physics option is offered with strong emphasis on participation in health physics activities of the UAB Radiation Safety Office for practical experience. A program leading to a BS in Biophysics is also available. Graduate study at the MS and PhD levels in Medical Physics is offered. The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: Edward L. Robinson, Department of Physics

ALABAMA, UNIVERSITY OF

University, Ala. 35486 (14,349 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	50%	6 hr	3250/9
Teaching assistant	15	50%	6 hr	3250/9
Fellow	3	–	12 hr	3625-4125/9

Special Facilities and Programs: Nuclear decay schemes; gamma-gamma angular correlation; lifetimes of excited states; fluorescence yields; internal conversion coefficients. The university is a member of Oak Ridge Associated Universities.

For Additional Information: George D. Cole, Department of Physics

ALASKA, UNIVERSITY OF

Fairbanks, Alaska 99701 (3,997 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	V	V	650/1
Teaching assistant	4	20 hr	9 hr	4050/9
Sr. research assistant	X	V	V	750/1

For Additional Information: T. D. Roberts, Department of Electrical Engineering
J. R. Sheridan, Department of Physics

ARIZONA STATE UNIVERSITY

Tempe, Ariz. 85281 (30,786 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Rad. safety officer asst.	1	25%	15 hr	150/1

Special Facilities and Programs: A nuclear engineering option is available in undergraduate mechanical and chemical engineering programs and as a pattern in undergraduate engineering science programs. At the MS level a nuclear engineering option is offered

in any of the established engineering fields. A nuclear subject may be selected for a PhD dissertation, but the degree must be in an established engineering field. The university is a member of Associated Western Universities.

For Additional Information: John F. Bregar, College of Engineering Science
Harry Whithurst, Chemistry Department

ARIZONA, UNIVERSITY OF

Tucson, Ariz. 85721 (27,552 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	45	29	19

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	5	50%	9 hr	2400-3250/9
Teaching assistant	2	25%	16 hr	1450-1900/9
Research associate	4	50%	9 hr	2900-3750/9
Teaching associate	4	25%	16 hr	1700-2300/9

Out-of-state tuition is waived

Special Facilities and Programs: A nuclear power systems program leading to a terminal MS prepares graduates for positions of responsibility in the nuclear central station power generation industry. Areas of research: reactor dynamics and control; direct conversion; neutron pulse and wave phenomena; nuclear materials; activation analysis; and nuclear power system applications. The university is a member of Argonne Universities Association and Associated Western Universities.

For Additional Information: Robert L. Seale, Department of Nuclear Engineering

AUBURN UNIVERSITY

Auburn, Ala. 36830 (14,528 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X
Nuclear Science	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	13-40 hr	0-15 hr	2760-11400/12
Teaching assistant	X	13-40 hr	0-15 hr	2070-8820/9
Fellow	X	None	10-15 hr	D + 1000-3000/9-12
Trainee	X	None	10-15 hr	1200-4000/9-12

Special Facilities and Programs: The Edmund C. Leach Nuclear Science Center, for all departments of the university, provides high intensity radiation sources (3 MeV accelerator, 2 MeV accelerator, cobalt-60 source, cobalt-60 teletherapy unit); specialized laboratory space (radiochemistry, counting, isotope storage, NMR spectrometer); support facilities (shops, small-animal housing, etc.); laboratory space for research and teaching, and Office of Radiological Safety. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Howard Carr, Department of Physics
John R. Cooper, Nuclear Science Center
Paul F. Parks, Dean of the Graduate School

BAYLOR UNIVERSITY

Waco, Texas 76703 (7,846 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	31	23	8

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	1	X	10 hr	T + 2700/9
Teaching assistant	8	10 hr	10 hr	T + 2700/9

Special Facilities and Programs: Research interests: Bragg-rule applicability to stopping cross sections of gases for alpha particles of energy 0.3-2.0 MeV; automatic beam positioning system for low-energy ion beams; range and dE/dx of C, N, O, F, and Ne in Be and C from 500 keV to 2 MeV; range of Ar, Kr, and Xe ions in solids in the 500 keV to 2 MeV region; alpha particle stopping cross sections in solids from 400 keV to 2 MeV; stopping cross sections of gases for alpha particles from 0.3 to 2 MeV.

For Additional Information: Darden Powers, Department of Physics
H. D. Schwetman, Department of Physics

BOSTON COLLEGE

Chestnut Hill, Mass. 02167 (11,787 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	X	12 hr	10 hr	3000M/9

For Additional Information: Robert L. Becker, Department of Physics
Walter J. Fimian, Department of Biology

BOSTON UNIVERSITY

Boston, Mass. 02115 (23,393 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	15	15 hr	8-12 hr	335/1
Research assistant	2	15 hr	12 hr	335/1
Fellow	1	none	20 hr	X

Special Facilities and Programs: Research includes: Mössbauer research with associated seminars; neutron activation as a technique to identify trace elements in the Environmental Pollution Analysis Seminar using the M.I.T. reactor under an AEC grant; photo-nuclear research at the 400 MeV electron linear accelerator (Bates Linear Accelerator) in Middleton, Mass.; photo-pion production and electron scattering.

For Additional Information: Edward C. Booth, Department of Physics

BOWLING GREEN STATE UNIVERSITY

Bowling Green, Ohio 43403 (15, 594 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	2	21 hr	8 hr	T + 2940
Graduate assistant	3	15 hr	12 hr	T + 2205

Special Facilities and Programs: BS and MS in physics with a strong background in quantum and electromagnetic theory.

For Additional Information: D. W. Bowman, Department of Physics

BRANDEIS UNIVERSITY

Waltham, Mass. 02154 (3,074 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Howard J. Schnitzer, Department of Physics

BRIGHAM YOUNG UNIVERSITY

Provo, Utah 84602 (28,061 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	4	X
Nuclear Physics	X	1	7
Applied Physics-Nuclear Power	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	7	10-20 hr	X	X
Teaching assistant	26	10-20 hr	X	X

Special Facilities and Programs: Research programs: fast reactor physics; experimental and theoretical cross sections; stability of hot plasmas; electrostatic confinement of plasmas; environmental effects of radiation; x-ray fluorescence for elemental analysis; Fission product yields; nuclear power plant systems analysis. The university is a member of Associated Western Universities.

For Additional Information: Gary Jensen, Department of Physics
Vern Rogers, Department of Physics and Chemical Engineering.

BROWN UNIVERSITY

Providence, R.I. 02912 (6,292 stud; coed; PhD; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X

Special Facilities and Programs: Experimental nuclear physics: neutron reactions at 14 MeV; biomedical applications of neutrons. Theoretical nuclear physics: elementary excitations; analog states; direct reaction phenomena via t-matrix, shell model, and coupled-channel methods. Experimental elementary particle physics: bubble chamber; counters and spark chambers employed at Brookhaven and Argonne National Laboratories; semi-automatic measuring machines process the data at Brown U. Theoretical high energy physics: elementary particle theory and field theory. The Rhode Island Nuclear Science Center Reactor is available to all universities in the state.

For Additional Information: R. A. Peck, Jr., Department of Physics

BRYN MAWR COLLEGE

Bryn Mawr, Pa. 19010 (1,494 stud; wo; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics		X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	X	50%	50%	2400/9

For Additional Information: John R. Pruett, Department of Physics

BUCKNELL UNIVERSITY

Lewisburg, Pa. 17837 (3,111 stud; [illegible]ed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	5	15 hr	75%	T + 2400/9
Scholar	1	none	100%	T

Special Facilities and Programs: Close liaison with the Department of Nuclear Engineering, Pennsylvania State University (55 miles)—technical consultation and use of laboratory facilities. Access to two nuclear power plants. A nuclear specialty is offered in BS programs in chemical, civil, electrical, and mechanical engineering. A program leading to the MS in physics with specialization in radiological physics is available.

For Additional Information: Richard Henry, Department of Physics
Lloyd Klinger, Electrical Engineering

BUTLER UNIVERSITY

Indianapolis, Ind. 46208 (4,239 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	1	12 hr	12 hr	T + 250/1

Special Facilities and Programs: Program is essentially a service to other disciplines. Included are radiopharmaceuticals, tracer and metabolic studies, analytical techniques, and radiological control.

For Additional Information: H. A. Swartz, Department of Bionucleonics

CALIFORNIA STATE UNIVERSITY

Fresno, Calif. 93710 (16,872 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	80	20 hr	6-9 hr	2480/10

Foreign students eligible

For Additional Information: Hugh Williamson, Department of Physics

CALIFORNIA STATE UNIVERSITY

Long Beach, Calif. 90840 (30,366 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	X	X	–
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	13	20 hr	20 hr	2500/10
Teaching assistant	25	20 hr	20 hr	2500/10
Technical assistant	2½	20-40 hr	V	2500-4000/10

Special Facilities and Programs: A special radiochemistry laboratory is available which provides the usual chemical equipment as well as basic counters. Upper division nuclear physics laboratory course with experiments on alpha, beta, and gamma spectroscopy, coincidence spectroscopy, absorption experiments, thermal neutron-induced activity, half-life determination, Compton scattering, etc., is offered. An upper division course in nuclear reactor theory is available.

For Additional Information: R. D. Bauer, Department of Chemistry
R. H. Chow, Department of Physics and Astronomy
J. L. Dyers, Department of Mechanical Engineering
C. W. Schultz, Department of Physics and Astronomy

CALIFORNIA STATE UNIVERSITY

Los Angeles, Calif. 90032 (24,631 stud; coed; MS; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	–
Health Physics	X	–	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	1-3	20M hr	–	V
Teaching assistant	8	20 hr	X	2300-2400/9

Special Facilities and Programs: Nuclear structure, few-nucleon problems, nuclear theory, radiation physics, astrophysics-nuclear reactions, X-ray fluorescence, and health and radiological physics. The university is a member of Associated Western Universities.

For Additional Information: D. J. Margaziotis, Department of Physics

CALIFORNIA STATE UNIVERSITY

Northridge, Calif. 91324 (25,728 stud; coed; MS; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	–	–
Nuclear Physics	X	X	–
Nuclear Chemistry	X	–	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant (P)	8	20 hr	1-12 hr	266/1
Graduate assistant (E)	4	20 hr	9 hr	266/1

Special Facilities and Programs: Low energy nuclear physics; beta-ray spectroscopy; electron polarization; neutron energy spectra, fast and moderated, measurement with NE-213 and NE-218 systems; topics in nuclear reactor kinetics and controls; sub-critical assemblies; and spectra of Am-Be, Pu-Be, and Cf-252 sources. The university is a member of Associated Western Universities.

For Additional Information: Duane Doty, Department of Physics
Gary Hordemann, Department of Engineering
Richard Sims, Department of Engineering

CALIFORNIA STATE UNIVERSITY

San Diego, Calif. 92115 (31, 360 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	41	25	–
Radiochemistry	15	9	1
Health Physics	–	X	–
Radiation Biology	–	9	–
Radiation Genetics	–	6	1

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	20 hr	9 hr	2300/10
Teaching assistant (B)	30	50%	50%	3660/9
Teaching assistant (C)	40	50%	50%	3660/9
Teaching assistant (P)	20	50%	50%	3660/9
NDEA Title 4	6	–	100%	2600-3000/X

Special Facilities and Programs: Radiation biology: Includes a lecture and laboratory course in basic principles of radiation biology, a graduate level course in environmental radiation, and a course in radioisotope techniques in biology in which students

are introduced to analytical equipment and techniques, including autoradiography, in a fully equipped radioisotope laboratory. A course in mutagenesis considers mutagenic effects of radiation and other mutagens. Research is conducted by faculty and graduate students in areas of radiation genetics (Drosophila) and radiation effects on sub-cellular particles (mammalian).

Nuclear chemistry: nuclear fission and applications of radioactivity in chemistry.
Physics: nuclear physics; radiation physics; radiological physics; health physics; activation analysis; whole body counter analysis; K-40 in humans; fission analysis; dating by fission damage tracks; tritium release. The university is a member of Associated Western Universities.

For Additional Information: Reilly C. Jensen, Department of Chemistry
James W. Neel or Frank J. Ratty, Department of Biology
Lester L. Skolil, Department of Physics

CALIFORNIA STATE UNIVERSITY

San Jose, Calif. 95192 (31,951 stud; coed; MS; general)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant*	10	20 hr	—	2666-2880/12
Teaching assistant	8	50%	12 hr	4513-4960/12

Chemistry Department only, but similar appointments available in Physics and Engineering.
* *Non-teaching*

Special Facilities and Programs: Interdisciplinary radiology facility designed for teaching tracer techniques to students in chemistry, engineering, physics, and biology. The facility contains two teaching laboratories, approximately five research laboratories, three counting rooms, change area, service center, darkroom, cave, and mechanical-tank areas. Radiochemistry tracer techniques are offered to upper division and graduate students. The health physics course contains those topics required to qualify as User for a California Radioactive Materials license providing appropriate laboratory techniques are learned in the laboratory courses. One course is of special interest to high school science teachers. A graduate course in synthesis with tracers is available. A radiochemistry option is available within the BS in Chemistry program. A radiochemistry research project may be elected for the MS degree. Summer school offerings are planned. The Mechanical Engineering Department offers a nuclear power option within the BS program. A neutron source is available for a variety of experiments of interest to nuclear engineers. A 4500 Ci Cs-137 irradiator is available for studies in radiation chemistry and radiation geology. The university is a member of Associated Western Universities.

For Additional Information: Robert M. Clothier, Department of Mechanical Engineering
R. P. Yaffe, Department of Chemistry

CALIFORNIA, UNIVERSITY OF

Berkeley, Calif. 94720 (28,483 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	—	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (N)	X	50%	50%	444/1
Teaching assistant (N)	2	50%	50%	444/1
Fellow (N)	3	none	100%	2000-4000/12
Tuition waiver (N)	6	none	100%	2100/12

Special Facilities and Programs: Graduate study leading to the degrees of MS, PhD, M Eng, and D Eng (Doctor of Engineering) is offered with the following fields of emphasis; nuclear reactor theory of thermal and fast-breeder reactors; nuclear fuel management; thermo-hydrodynamic problems in reactor engineering; chemical and material aspects of nuclear technology; radiation protection; biological, environmental, and safety aspects of nuclear power generation; thermonuclear fusion; neutron physics; nuclear physics and chemistry. An undergraduate double-major program exists with the Departments of Mechanical, Electrical and Civil Engineering leading to four-year bachelor's degrees in NE-ME, NE-EE, and NE-CE.

Strong emphasis is placed on the environmental and safety aspects of nuclear power generation, and special courses and research have been initiated in this area of nuclear engineering. Indeed, as the nuclear industry is expanding rapidly, the need for graduates with experience in these areas is pressing.

Instructional and research facilities of the Department include a one-megawatt research reactor (TRIGA, Mark III) which can be pulsed to 1400 megawatts, a 1-MeV Van de Graaff generator, two small accelerators for pulsed neutron experiments, a graphite-moderated subcritical assembly, and a full range of instrumentation for the measurement of nuclear radiations and for radio-

chemical studies. Facilities are available for the study of problems of heat transfer and fluid flow in nuclear reactors, including various experimental loops.

The nuclear materials research program of the Department utilizes quadrupole mass spectrometers, and a variety of high temperature and high vacuum equipment for chemistry-materials experiments, as well as for thermionic diode studies. Experimental programs in chemistry-and-materials and in thermonuclear fusion in the Department enjoy limited access to the facilities of the Lawrence Berkeley and Lawrence Livermore Laboratories.

Computational facilities available to the Department consist of a D.E.C. PDP-7 computer in the College of Engineering, as well as the facilities of the Campus Computer Center, which include two CDC-6400 computers. The Department owns a Wang 700A Electronic Desk Computer.

For Additional Information: Lawrence M. Grossman, Department of Nuclear Engineering

CALIFORNIA, UNIVERSITY OF

Davis, Calif. 95616 (15,279 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	—	X	X
Nuclear Physics	—	X	X
Nuclear Chemistry	—	X	X
Radiochemistry	—	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	4	20 hr	9 hr	6000/12*
Teaching assistant	1	20 hr	9 hr	4000/12†
Fellow	16	—	12 hr	4000-6000/12*
Student employee	15	20 hr	12 hr	6000-9000/12‡

**Tax free*
†Out-of-state fees waived
‡Foreign students not eligible

Special Facilities and Programs: The facilities listed include those of the Lawrence Livermore Laboratory, many of which are readily available for graduate student research, and the Crocker Nuclear Laboratory. Areas of special interest include plasma physics and controlled thermonuclear fusion; laser technology; applied nuclear technology; nuclear reactions; neutron physics; nuclear structure; activation analysis; equation of state studies; advanced uses of computers; environmental studies; materials science; hydrodynamics. The university is a member of Associated Western Universities.

For Additional Information: Raymond N. Keefer, Department of Chemistry
William J. Knox, Department of Physics
Frederick Wooten, Department of Applied Science

CALIFORNIA, UNIVERSITY OF

Los Angeles, Calif. 90024 (29,637 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	8	50%	50%	V
Teaching assistant	1	50%	50%	V
Fellow	4	—	100%	V
Trainee	8	—	100%	V

Special Facilities and Programs: The UCLA School of Engineering and Applied Science consists of seven departments, one of which, Energy and Kinetics, is responsible for programs in Nuclear Science and Engineering, Heat and Mass Transfer and Thermodynamics. Emphasis is on Fast Reactor Behavior in areas dealing with design and safety of Liquid Metal Fast Breeder Reactors. Our work in Safety and Siting of Water Reactors has generated particular interest by the AEC Office of Planning and Division of Regulation. Graduate students in both these areas have been employed in the National Labs and regulatory bodies. In addition to the permanent faculty, there are four Adjunct Professors involved in research in these fields. The Nuclear Science and Engineering program is supported by other laboratories of the School of Engineering and Applied Science including ceramics laboratory, material testing laboratory, electronics laboratory, instrumentation laboratory as well as other facilities of the School such as the Instrumentation Facility (with approximately 3,000 instruments available to staff and students), a large well-equipped machine shop (including gas arc and heli-arc welders), and extensive computer facilities including an IBM 360/91 served by IBM 1401's and other ancillary equipment. The UCLA library is among the largest in the United States. The Engineering and Math Science branch contains over 90,000 volumes. It is, in addition, an AEC Depository Library. Available Facilities: 100 Kw Argonaut research reactor with pneumatic transfer system (rabbit); A1001 Kaman Neutron Generator; A800 Kaman Neutron Generator; subcritical assemblies 1-5 ft. dia. tank fueled with natural uranium slugs and D_2O moderated 1-5' x 6' x 8' graphite assembly fueled with natural uranium slugs; high temperature vacuum furnace with complete

optical pyrometer system; Ge-Li detection system; G-M and scintillation counting systems; multi-channel analyzers; associated electronic equipment; liquid metals experimental loop. The university is a member of Associated Western Universities.

For Additional Information: Thomas E. Hicks, School of Engineering and Applied Science

CALIFORNIA, UNIVERSITY OF

San Diego, Calif. 92037 (6,890 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	11

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	50%	9 hr	4800/12

Foreign students eligible

Special Facilities and Programs: Theoretical low energy physics. The university is a member of Associated Western Universities.

For Additional Information: Chairman, Department of Physics

CALIFORNIA, UNIVERSITY OF

Santa Barbara, Calif. 93106 (12,300 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	21	6	–
Nuclear Science	–	20	10
Nuclear Physics	–	42	29

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	75%	25%	375/1
Teaching assistant	6	50%	50%	3600/9
Fellow	5	–	100%	750/1

Special Facilities and Programs: Depleted U-238 sphere available for research connected with fast breeder development, EG & G facilities available for student research. Testing machine for studies of radiation effects on materials.

The Nuclear Engineering Program emphasizes education in nuclear power development, present and future. A large number of courses are offered at the undergraduate level, thus permitting greater study and research in depth at the graduate level. The university is a member of Associated Western Universities.

For Additional Information: H. Fenech, Department of Nuclear Engineering
R. M. Eisberg, Department of Physics

CARNEGIE-MELLON UNIVERSITY

Pittsburgh, Pa. 15213 (4,403 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	20 hr	12 hr	T + 325M/1
Teaching assistant	2	12 hr	100%	T + 2475/9
Industry fellow*	12	–	100%	X
Fellow	4	–	100%	T + 2475M/9
Scholar	2	–	100%	T

*Awarded directly to employee by local industry.

Special Facilities and Programs: The Department of Nuclear Science and Engineering offers four major options of study and research at the graduate level: nuclear reactor engineering; nuclear power systems; fusion technology; and reactor physics and mathematics. Current research includes reactor safety and accident analysis; modeling, systems analysis and reliability techniques as applied to nuclear systems; thermonuclear reactor feasibility; thermonuclear reactor dynamics and control; fission reactor dynamics and control; neutron transport and reactor theory; optimization techniques applied to reactor design, reactor system and fuel management problems; reactor noise analysis; analysis of reactor observables and response characterization; applied numerical analysis; impact of nuclear power on the environment; total nuclear power complexes; thermo-fluid aspects of reactor design; energy conversion cycles. The department benefits from a wide range of interactions with the large and varied nuclear industry community in the Pittsburgh area. The university is a member of Argonne Universities Association.

For Additional Information: Claude G. Pencelet, Department of Nuclear Science and Engineering

CASE WESTERN RESERVE UNIVERSITY

Cleveland, Ohio 44106 (9,068 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	3	4

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Fellow	8	8-12 hr	9 hr	T + 485/1

Special Facilities and Programs: Nuclear program functions as a users group at the Los Alamos Meson Physics Facility. The university is a member of Argonne Universities Association.

For Additional Information: K. L. Kowalski, Department of Physics (theoretical physics)
F. Miraldi, Engineering School
H. B. Willard, Department of Physics (experimental physics)

CATHOLIC UNIVERSITY OF AMERICA

Washington, D.C. 20017 (6,654 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	X
Nuclear Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	3	16 hr	100%	T + 2400/9

Foreign students eligible.

Special Facilities and Programs: Cooperative research agreements are in effect between Catholic University and (a) National Bureau of Standards, Gaithersburg, Md., for use of 10 Mw research reactor; (b) Armed Forces Radiobiology Research Laboratory (AFRRI), Bethesda, Md., 30 MeV linear accelerator and 1 Mw Triga reactor; (c) Radiation Effects Laboratory, Edgewood, Md., 15 MeV Tandem Van de Graaff accelerator.

Two heat transfer labs with extensive instrumentation, recording and high speed photographic equipment, large water loop for study of non-equilibrium processes and Freon loop for steady-state and transient two-phase flow.

Areas of research include: Radiobiology, activation analysis, low energy nuclear physics, fission physics, radiation dosimetry, radiation damage, reactor heat transfer and fluid flow, reactor safety. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Charles C. Graves, Department of Nuclear Science and Engineering

CHICAGO, UNIVERSITY OF

Chicago, Illinois 60637 (7,731 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Health Physics	–	X	X

Special Facilities and Programs: Master of Science and PhD degrees in Medical Physics granted by the Department of Radiology. These programs are directed toward the training of students with the baccalaureate degree in physics for a career in Medical Sciences. At the Master's degree level, the training is in Radiological Physics or Health Physics. It develops a basic understanding of Biology through courses in Botany, Zoology, Physiology and Biochemistry. Courses in Radiological Physics, Health Physics and Biophysics develop a specialized knowledge of the field. The program requires 7 quarters. At the PhD level the training is broader and intended to prepare the student for the application of physical principles and methods to any one of a number of areas of Medical Science. The program will normally take four years to complete and requires about 36 quarter courses beyond the baccalaurate. At least 10 and not more than 15 must be Physical Science and approximately 9 will be in research. The university is a member of Argonne Universities Association.

For Additional Information: Lester S. Skaggs, Department of Radiology

CINCINNATI, UNIVERSITY OF

Cincinnati, Ohio 45221 (32,775 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	12 hr	15 hr	T + 3600/12*
Teaching assistant	7	12 hr	15 hr	T + 3600/9

* *50% tax free if used for thesis.*

Special Facilities and Programs: Engineering aspects of nuclear radiations; space-time nuclear reactor kinetics; medical applications of nuclear technology; environmental problems of nuclear power production; neutron activation analysis; nuclear fuel processing and management; radioactive waste treatment; pulsed-neutron measurements; radiation shielding; and thermal aspects of power reactors, The university is a member of Argonne Universities Association.

For Additional Information: James N. Anno, Department of Chemical and Nuclear Engineering

CITADEL MILITARY COLLEGE OF SOUTH CAROLINA

Charleston, S.C. 29409 (2,884 stud; men; BS; general)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: R. Bender, Department of Physics
O. Herring, Department of Engineering

CLARK UNIVERSITY

Worcester, Mass. 01610 (3,194 stud; coed; PhD; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Chemistry	—	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	5	10-20 hr	16 hr	T + 3700M/12
Teaching assistant	10	10-15 hr	16 hr	T + 3700M/12
Fellow	2	—	100%	Federal

Special Facilities and Programs: Chemistry: Studies of nuclear structure as revealed by measurement of nuclear decay schemes and lifetimes of nuclear energy levels. Cooperative arrangements enable us to use the MIT reactor, the Yale heavy-ion accelerator, the Texas A & M cyclotron, and the Berkeley Super-HILAC. Physics: Studies in perturbed angular correlations and Mössbauer effect with applications to solid-state problems. High temperature annealing and diffusion facility, source irradiation at Harvard cyclotron and Washington University Cyclotron.

For Additional Information: Daeg S. Brenner, Department of Chemistry
C. Hohenemser, Department of Physics

CLARKSON COLLEGE OF TECHNOLOGY

Potsdam, N.Y. 13676 (2,434 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Robert A. Shaw, Department of Chemical Engineering
Thomas J. Ward, Department of Chemical Engineering

COLORADO SCHOOL OF MINES

Golden, Colo. 80401 (1,688 stud; coed; PhD; prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	8-20 hr	9 hr	T + V
Teaching assistant	5	8-20 hr	9 hr	T + V

Special Facilities and Programs: Special short courses for industrial requirements are offered on demand. Summer radioisotope course for superior high school students is offered.

For Additional Information: J. J. Burnett, Department of Physics

COLORADO STATE UNIVERSITY

Fort Collins, Colo. 80521 (17,427 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Radiation Biology	—	X	X
Health Physics	—	X	X
Veterinary Radiology	—	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	15	50-75%	12 hr	V

Special Facilities and Programs: 2200-Beagle Colony for study of long term radiation effects (USPHS); graduate program in Veterinary Radiology; whole-body counting facility for domestic and wild animals; radioecology study facilities for wildlife (deer, pica), for fish, and for short grass prairies; synchronized tissue culture facilities for radiation effects studies at cellular level;

and zonal centrifuge for radiation biology and biophysics at subcellular level. The university is a member of Associated Western Universities.

For Additional Information: Hilding G. Olson, Department of Mechanical Engineering
Max R. Zelle, Department of Radiology and Radiation Biology

COLORADO, UNIVERSITY OF

Boulder, Colo. 80302 (22,053 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	10	20 hr	9-12 hr	3400/9
Teaching assistant	2	20 hr	9-12 hr	3000/9

Special Facilities and Programs: Interaction of light with plasmas and solids; Compton scattering by K-electrons; properties of nuclear states excited by radioactive sources; applications of s-matrix to strong, weak, and EM interactions; quantum dynamics in terms of group representations with applications to the structure of hadrons, leptons, and atoms; interaction of radiation with atoms and simple molecules; theory of composite particles in many-body system and transport processes in photon-electron systems; boson-exchange models for baryon-baryon interactions; high energy meson-meson scattering; experimental work on nuclear reactions and structure; analysis of trace elements in the environment using charged-particle excited X-ray fluorescence; medical studies with a cyclotron; theoretical studies of reaction mechanisms in the bombardment of nuclei by projectiles such as protons, deuterons, He-3, and alpha particles; fast neutron spectroscopy; instrumentation for neutron physics; medic X-ray studies; mathematical problems of quantum scattering theory; statistical models of nuclear structure; symmetry properties of the elementary particles; Pi-meson and proton scattering to low-lying nuclear states; interaction of mass 3-particles with complex nuclei; theoretical nuclear physics involving determination of nuclear interactions using direct reactions, pion-nucleus scattering, and nuclear reactions involving pions; experimental studies of nuclear scattering and reactions in the very light nuclei, $A \leqslant 6$; strong interaction studies such as hyperon-nucleon interactions from 0 to 20 GeV/C; neutron producing reactions; search for new isotopes and studies of their decay schemes. The university is a member of Associated Western Universities.

For Additional Information: David A. Lind, Department of Physics

COLUMBIA UNIVERSITY

New York, N.Y. 10027 (15,272 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	–	–	X
Nuclear Engineer*			

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	7	50%	100%	T + 3000-3300/12
Teaching assistant	3	50%	100%	T + 2400/8
Fellow	2	0	100%	T + 1900/8
Trainee	8	0	100%	T&D + 2400-2800/12

** Degree intermediate between MS and Dr Eng Sci*

Special Facilities and Programs: Neutron Cross Sections and Fission Physics: Extensive research in these areas, mostly using the 380 MeV synchrocyclotron (currently being upgraded to 550 MeV); High resolution transmission measurements, (n, γ) and (n, fission) cross sections, details of the fission process, extensive use of computers. Transport Theory: Study deep penetration of neutrons and gammas in infinite and finite media with emphasis on the sensitivity of resultant distributions to features of cross sections. Medical Applications of Radiation; Studies of radiation doses delivered in therapy using various sources; Tracing movement of isotopes within the body using Gamma Camera with applications to medical diagnosis. Heat Transfer: Active research and programs in Nuclear Heat Transfer and physical properties of nuclear coolants include the Heat Transfer Research Facility (which does burn-out and other thermal tests for all manufacturers of water cooled reactors) and the Liquid Metals Research Laboratory (currently measuring key thermal properties of sodium and other nuclear fluids).

For Additional Information: W. W. Havens, Jr., Division of Nuclear Science and Engineering

CORNELL UNIVERSITY

Ithaca, N. Y. 14850 (9,924 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering and Science	–	5	16
Nuclear Engineering (Prof.)	–	24	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	20 hr	75%	T & F + X
Teaching assistant	2	15 hr	75%	T & F + X
Fellow	2	–	100%	T & F + X

Foreign students eligible

Special Facilities and Programs: Cornell Critical Facility: A versatile reactor physics research and training reactor. Triga Reactor: A 100 kW (250 MW pulsed) reactor. Gamma Cell: 5,000 Ci Co-60 for radiation chemistry, materials, and biological research. Radiation Biology Laboratory. Cornell Energy Project: An interdisciplinary (engineers, economists, biologists, sociologists, political scientists, ecologists) study of energy production and the environment. Reactor Safety and Radiation Protection: A master of engineering (nuclear) program with an emphasis on reactor safety, radiation protection, and nuclear environment engineering. Dynamitron: 3 MeV proton, deuteron, etc., high current accelerator. The university is a member of Associated Universities, Inc.

For Additional Information: K. B. Cady, Department of Applied and Engineering Physics
J. C. Thompson, Jr., Department of Physical Biology

CREIGHTON UNIVERSITY

Omaha, Neb. 68178 (4,341 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching fellow	4	12 hr	9-10 hr	2700/9 (1st year) 2800/9 (2nd year)

Special Facilities and Programs: A cooperative agreement exists with the Veterans Administration Hospital in Omaha for use of their Triga reactor. Honor research programs enable students to participate in nuclear spectroscopy research and atomic X-ray fluorescence research.

For Additional Information: Sam J. Cipolla, Department of Physics

DAYTON, UNIVERSITY OF

Dayton, Ohio 45409 (8,272 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	4	50%	50-75%	2400-2800/8

Special Facilities and Programs: Radiotracer methodology applicable to biological and chemical research includes some aspects of health and environmental science. A course in the Biology Department covers basic radiation physics, counting and assay techniques, principles of dosimetry, and health and environmental effects of radiation. Three faculty members employ radioisotopes extensively for tracer work in intermediary metabolism, radioimmunoassay, and distribution studies (autoradiography at microscopic level). The MS program in physics includes nuclear physics as a thesis option.

For Additional Information: Donald R. Geiger, Department of Biology

DELAWARE, UNIVERSITY OF

Newark, Del. 19711 (17,503 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	20	50%	75%	300-400/1
Teaching assistant	30	50%	75%	300/1
Fellow	20	0	100%	300/1

Special Facilities and Programs: Research interests include: Interaction of microwaves with plasma (created by microwave) near cyclotron resonance; Light element level structure; Angular correlation; Computer codes for reactor economic and burnup analysis.

For Additional Information: R. B. Murray, Department of Physics
W. F. Walters, Department of Mechanical and Aerospace Engineering

DENVER, UNIVERSITY OF

Denver, Colo. 80210 (8,937 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	50%	10 hr	3800-4400/12
Teaching assistant	X	15 hr	10 hr	2500/9
Fellow	X	—	12 hr	2400 up/X

Foreign students eligible

Special Facilities and Programs: The university is a member of Associated Western Universities.

For Additional Information: Charles B. Magee, Department of Chemical Engineering and Metallurgy

DE PAUL UNIVERSITY

Chicago, Illinois 60614 (9,311 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	9	16 hr	8-12 hr	T + 2270-2400/10

Foreign students eligible

Special Facilities and Programs: A Radiologic Technology Baccalaureate Program consists of three years of academic collegiate education plus one year of clinical training and practicum in an affiliated hospital. The academic education includes seven courses in physics, three of which are related to the nuclear area.

For Additional Information: K. F. Robak, Department of Radiologic Technology
T. G. Stinehcomb, Department of Physics

DE PAUW UNIVERSITY

Greencastle, Ind. 46135 (2,350 stud; coed; MS; general)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	2	10 hr	75%	T & F + 1000/9

Special Facilities and Programs: Research: neutron cross sections; effects of radiation on insects and lower animals.

For Additional Information: Hugh F. Henry, Department of Physics

DRAKE UNIVERSITY

Des Moines, Iowa 50311 (7,521 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	37	10 hr	9 hr	T + 2000-2500/X

For Additional Information: Leland P. Johnson, Dean of the College of Liberal Arts

DREXEL UNIVERSITY

Philadelphia, Pa. 19104 (8,393 stud; coed; PhD; prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant*	2	50%	6-9 hr	2475/9
Research assistant	13	20 hr	9 hr	2475-3150/9
Teaching assistant	15	6 hr	9 hr	2475-2925/9
Fellow	2	–	9 hr	2250-2700/9

Foreign students eligible
* *MS level*

Special Facilities and Programs: Research areas: power systems with emphasis on energy utilization; disposal of radioactive waste; thermal pollution and cooling towers; study of the (He-3, n) reaction tandem bombarding energies; heavy ion transfer reactions producing energetic neutrons. A specially constructed thick radiator proton recoil counter is used to measure neutron energy spectra in the energy range up to 35 MeV. Experiments are carried on off-campus using a tandem accelerator at the University of Pennsylvania.

For Additional Information: Harry L. Brown, Center for Urban Research and Environmental Studies
Kenneth Geller, Department of Physics

DUQUESNE UNIVERSITY

Pittsburgh, Pa. 15219 (8,515 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Health Physics	X	–	–

For Additional Information: Walter S. Skinner, Department of Physics

EAST TEXAS STATE UNIVERSITY

Commerce, Texas 75428 (8,638 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	6	12-15 hr	10 hr	2700/9

Foreign students eligible

Special Facilities and Programs: Physics Department: neutron activation analysis using both neutron howitzer (3 Ci Pu-Be source) and 14 MeV (d,t) neutrons in shielded laboratory specially designed for neutron research; atomic collision studies utilizing 150 keV proton accelerator; X-ray absorption and emission spectroscopy utilizing X-ray diffractometer; charged particle induced X-ray fluorescence analysis utilizing 150 keV proton accelerator and LN cooled Si(Li) detector. Chemistry Department: low-level beta particle counting of atmospheric samples; mass spectroscopy.

For Additional Information: Charles E. Jones, Department of Physics

EMORY AND HENRY COLLEGE

Emory, Va. 24327 (917 stud; coed; BS; general)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Principles of activation analysis, neutron diffusion studies, and proton and deuteron scattering studies.

For Additional Information: Cecil M. Nelson, Department of Physics

EMORY UNIVERSITY

Atlanta, Ga. 30322 (6,382 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	X	X	X
Nuclear Physics	X	X	X
Health Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	8	10-12 hr	10 hr	T + 2150/9

Special Facilities and Programs: Physics: Reactor facilities available at Georgia Institute of Technology. Radiological Physics: Radiation dosimetry; radiation chemistry; radiobiology; health physics; X-ray generators and betatron. The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: J. M. Palms, Department of Physics

FLORIDA STATE UNIVERSITY

Tallahassee, Fla. 32306 (19,160 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X
Nuclear Chemistry	X	X	X
Radiochemistry	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	20M hr	15 hr	4700/12
Teaching assistant	X	2 labs	15 hr	3525/9
Fellow	X	–	15 hr	4700/12

Special Facilities and Programs: Basic research in particle, nuclear, atomic, molecular, solid state physics; chemistry; biochemistry, biophysics, biology, psycho-biology; geology. Applications to oceanography, geophysical fluid dynamics, meteorology, space sciences, materials research, environmental problems. The university is a member of Oak Ridge Associated

Universities, University Space Research Association, Gulf Universities Research Corporation, University Corporation for Atmospheric Research, Highlands Biological Station. Individual faculty members and their students belong to users groups at national laboratories such as the 200 GeV accelerator (Weston, Illinois), the Los Alamos Meson Physics Facility, the Space Radiation Effects Laboratory (Newport News, Virginia), the Brookhaven and Argonne National Laboratories, and the Lawrence Radiation Laboratory (Berkeley).

For Additional Information: H. S. Plendl, Department of Physics

FLORIDA, UNIVERSITY OF

Gainesville, Fla. 32611 (24,801 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	51	45	15
Nuclear Physics	—	7	6
Health Physics	—	35	8

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	20	15-20 hr	12-14 hr	300-400/1
Teaching assistant	10	15 hr	14 hr	300-325/1
Fellow*	5	—	100%	300-325/1
Trainee (AEC)*	5	—	100%	TFD + 2800/12

Foreign students eligible for all except traineeships.
Out-of-state tuition waived.
* *Non-taxable*

Special Facilities and Programs: Department of Nuclear Engineering Sciences of the College of Engineering: Interdisciplinary education is accomplished through the cooperation of the Departments of Chemistry and Physics in the College of Arts and Sciences; the Departments of Botany and Entomology in the College of Agriculture, the Department of Radiology in the College of Medicine, and the Departments of Environmental, Electrical and Metallurgical and Materials Engineering in the College of Engineering.

The major items of equipment include: a 100 kw Argonaut type nuclear reactor, a 16 K IBM-1800 digital computer for on-line data acquisition and analysis, a hybrid computer facility, two analog computers, a large, near-critical, one-of-a-kind subcritical facility, three neutron generators, a 300 MW pulsed source for plasma and laser applications, a uranium plasma facility, a positron gun, four multi-channel analyzers as well as a large amount of specialized nuclear instrumentation. The Department shares the use of the 4 MeV Van de Graaff facility with the Physics Department.

The research activities of the department are: the dynamics of nuclear systems (with emphasis on neutron-wave and pulse propagation studies in fast and thermal systems); space-time kinetics and noise measurements in subcritical and zero-power systems, the application of hybrid computer techniques to reactor dynamics problems, plasma engineering (with emphasis on fissioning uranium plasmas, nuclear-pumped lasers, plasma spectroscopy, nuclear-seeded MHD plasmas), neutron transport theory (with emphasis on the development and application of invariant imbedding techniques), chemical structural studies by nuclear techniques (with emphasis on the perturbed angular correlation technique), nuclear materials research (with emphasis on the high temperature, high pressure properties of graphite). Other areas of research emphasis are: neutron cross-section measurements, fluorocarbon and other rare gas compound studies, the nuclear space plane (shuttle) concept, development of a high intensity, ultrasonic, thermal neutron spectrometer, the study of neutron-electron interactions, development of an environmental surveillance program for Florida Power Crystal River plant (in conjunction with environmental engineering), development of biomedical nuclear instrumentation.

Radiological Health: Some 5,000 square feet of space is devoted to research and teaching of radiological health. The area includes a low-level counting room with adjacent preparation room, air lock, and pass-through window; a radiation surveillance laboratory and counting room; three research laboratories, an electronic shop, and an isotope storage room with vault.

The radiological laboratories contain modern radiation detection instrumentation. In addition to seven scalers with attendant detection systems and counting shields, there are also available three automatic gas-flow proportional counting systems with readout facilities, a 200-sample automatic liquid scintillation system, a single-channel analyzer, and two multi-channel analyzers having various data processing units and readout models. Remote handling devices, film badges, and pocket dosimeters, as well as a wide range of radiation survey instruments are provided for personnel protection. TLD systems and X-ray training facilities are available.

The controlled area, low-level facility is located within a thick concrete semi-vault. A two inch thick lead shield lined with copper and cadmium further protects the 3 x 4 inch sodium iodide crystal so that very low concentrations of gamma activity in environmental samples can be identified and measured. GeLi detector systems and attendant shields are also located in the semi-vault.

Additional facilities are available through interdisciplinary cooperation with other departments including the Department of Radiology, College of Medicine, the Institute of Food and Agricultural Sciences, the Department of Nuclear Engineering, and the Computing Center (IBM 370/165).

Nuclear Physics: 4 full-time faculty; 1 Post Doc; 4 full time technical personnel. Nuclear reaction studies, nuclear spectroscopy, with an excellent supply of instrumentation.

The university is a member of Oak Ridge Associated Universities.

For Additional Information: W. E. Bolch, Interdepartmental Radiation Protection Program
G. Dunnam, Department of Physics
F. J. Hanrahan, Department of Chemistry
M. J. Ohanian, Department of Nuclear Engineering Sciences

GEORGETOWN UNIVERSITY

Washington, D.C. 20007 (9,781 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	12	7

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	20 hr	9-12 hr	5600-6000/12
Fellow	10	20 hr	9-12 hr	T + 2600/9

Special Facilities and Programs: Nuclear Physics: Multiparticle breakup reaction mechanism research and applied programs are carried out on the university's 0.4 and 2 MeV Van de Graaffs, the NRL cyclotron, and the University of Maryland's cyclotron. Nuclear Biophysics: Effect of whole-body neutron irradiation on metabolic activity in isolated systems. Chemistry: Tracer techniques in biochemical reaction studies.

For Additional Information: Paul A. Treado, Department of Physics

GEORGE WASHINGTON UNIVERSITY

Washington, D.C. 20006 (21,529 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	10	6 hr	9 hr	T + 2800/9

Special Facilities and Programs: Nuclear scattering and reactions (theoretical). Photodisintegration, electrodisintegration, and quasi-elastic scattering in few-nucleon systems (A = 3, 4, 6) through cooperative arrangement we have available the facilities at the National Bureau of Standards and the Naval Research Laboratory.

For Additional Information: J. C. Eisenstein, Department of Physics

GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, Ga. 30332 (8,048 stud; coed; PhD; prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering*	X	X	X
Nuclear Science	–	X	–
Nuclear Physics	–	–	X
Nuclear Chemistry	–	X	X
Radiochemistry	–	X	X

*Includes Health Physics.

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (C)	2	20 hr	12 hr	300-340/1†
Research assistant (N)	14	33%	14 hr	800/3*
Teaching assistant (C)	X	X	X	X†
Teaching assistant (N)	4	33%	14 hr	800-850/3*
Teaching assistant (P)	15	12 hr	12 hr	2800/9
Fellow	3	–	18 hr	T + 2400/12
Trainee	14	–	18 hr	T + 2400/12

* Out-of-state tuition waived.
† Foreign students eligible.

Special Facilities and Programs: Chemistry: Measurement of K, L, and M subshell X-ray fluorescence yields and Coster-Kronig transition probabilities throughout the periodic table; Measurement of M/L orbital electron capture ratios in Fe-55 decay; Investigation of atomic inner shell transitions arising from K, L, and M shell vacancies produced by radioactive decay; Studies of nuclides far from stability. Nuclear Engineering: Training programs for reactor operators, radiation protection and paramedical personnel; BS program in health physics; Short courses in Nuclear Power Management, Nuclear Fuels-Management and Economics, and Advanced Power Plant Technology. Physics: Beta-gamma and gamma-gamma directional correlations; Nuclear decay schemes; Capture gamma-ray spectroscopy and nuclear structure. The university is a member of Oak Ridge Associated Universities and a participant in the UNISOR program.

For Additional Information: R. W. Fink, School of Chemistry
J. R. Stevenson, School of Physics
L. E. Weaver, School of Nuclear Engineering

GEORGIA, UNIVERSITY OF

Athens, Ga. 30601 (22,598 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	5	7

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	20	12 hr	10 hr	3300-3600/9

Special Facilities and Programs: Neutron polarization, neutron inelastic scattering, neutron spin-flip probability, analog states, (p,n) reactions, X-ray trace analysis, He-3 induced reactions, He-3 elastic scattering-on campus. Medium energy inelastic proton scattering done at Oak Ridge. The university is a member of Oak Ridge Associated Universities.

For Additional Information: M. M. Duncan, Department of Physics and Astronomy
J. H. Henkel, Department of Physics and Astronomy

HAMPTON INSTITUTE

Hampton, Va. 23668 (2,676 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Stepan V. Benda, Department of Physical Sciences

HARVARD UNIVERSITY

Boston, Mass 02115 (19,322 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Health Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Fellow	7	–	100%	250-300/1

Special Facilities and Programs: Radiation protection engineering and dosimetry, reactor containment, cleanup systems for radioactive sodium aerosols, environmental radiation protection, and air and gas cleaning. Students may take up to one-half of their courses at M.I.T. (nuclear engineering, meteorology, etc.). The university is a member of Associated Universities, Inc.

For Additional Information: Dade W. Moeller, Department of Environmental Health Sciences

HAWAII, UNIVERSITY OF

Honolulu, Hawaii 96822 (22,320 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	9	20 hr	9 hr	3608/9
Teaching assistant	12	20 hr	9 hr	3608/9

For Additional Information: Walter R. Steiger, Department of Physics and Astronomy

HOFSTRA UNIVERSITY

Hempstead, N.Y. 11550 (12,406 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	6	14 hr	9 hr	T + 2400/9

Special Facilities and Programs: BS and MS in Physics with considerable course work in nuclear physics. Eight semesters of atomic and nuclear physics lab. Over sixty experiments in nuclear physics are available. Same facilities for alpha, beta, gamma, and neutron spectroscopy and coincidence measurements.

For Additional Information: H. Glaser, Department of Physics
S. P. Goldstein, Department of Engineering
J. A. Moore, Department of Physics

HOUSTON, UNIVERSITY OF

Houston, Texas 77004 (26,473 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	50%	12 hr	2700/9
Teaching assistant	1	50%	12 hr	2700/9

Foreign students eligible

Special Facilities and Programs: The university has a joint group with Rice University in medium energy nuclear physics. This group is studying the interaction of pions with nuclei. A Mössbauer setup within the Department of Physics is used for various experiments dealing with interference between resonance scattering and Rayleigh scattering. The university is a member of Associated Western Universities.

For Additional Information: Bill W. Mayes, II, Department of Physics

IDAHO STATE UNIVERSITY

Pocatello, Idaho 83201 (7,799 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	–
Nuclear Science	–	X	–
Nuclear Physics	X	X	–
Radiochemistry	–	X	–
Health Physics	X	–	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	4	15 hr	12 hr	2400/9

Special Facilities and Programs: Radiation and reactor safety; nuclear instrumentation and reactor control. The two-year program in Radiation Protection Technology is offered in cooperation with the National Reactor Testing Station, and graduate credit for research at that AEC facility is possible (sixty miles from the campus). The university is a member of Associated Western Universities.

For Additional Information: Frank Harmon, Department of Physics
A. E. Wilson, Department of Nuclear Science and Engineering

IDAHO, UNIVERSITY OF

Moscow, Idaho 83843 (7,120 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	2	–
Nuclear Science	–	12	–
Nuclear Physics	–	5	1
Radiochemistry	–	8	2

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	33-50%	12 hr	2800/10
Teaching assistant	3	33-50%	12 hr	2800/10

Special Facilities and Programs: A master's degree program in science and engineering is carried on at the National Reactor Testing Station, Arco, that includes nuclear science and radiological science. Use is made of the 1MW reactor and 2-MeV Van de Graaff accelerator at Washington State University, eight miles away. The university is a member of Associated Western Universities, and joint work with staff at NRTS and at the University of California, Davis, is carried out. Areas of special interest include nuclear engineering, hot atom chemistry, nuclear structure, few-nucleon interactions, and applications of nuclear technology. Several faculty members are members of the LAMPF Users Group, with active participation in the Nucleon Physics program.

For Additional Information: W. P. Barnes, Department of Mechanical Engineering
C. M. Wai, Department of Chemistry
H. Willmes, Department of Physics

ILLINOIS INSTITUTE OF TECHNOLOGY

Chicago, Illinois 60616 (6,375 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	4	3
Nuclear Chemistry	–	–	1

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	X	V	13 hr	244-322/1

Foreign students eligible

Special Facilities and Programs: The university is a member of Argonne Universities Association.

For Additional Information: E. E. Segel, Department of Physics

ILLINOIS, UNIVERSITY OF, AT CHICAGO CIRCLE

Chicago, Illinois 60680 (20,703 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	16	19 hr	12 hr	T + 1067/3*
Teaching assistant	78	19 hr	12 hr	T + 1067/3
Fellow	10	0	16 hr	T + 2000/9

Foreign students eligible
* *Tax exempt*

Special Facilities and Programs: Theoretical nuclear physics: Theoretical and experimental high energy physics programs are offered. Special advanced courses given as needed. High energy physics: K^0 decays; CP violation; scattering; weak and strong interactions; resonances; symmetries; field theory; Regge poles. Nuclear physics: Nuclear structure; hypernuclei; nuclear potentials; deformed nuclei; recoil measurements; proton reactions. Faculty and graduate students use Argonne and Batavia facilities.

For Additional Information: H. Goldberg, Department of Physics
J. Hartnett, Department of Energy Engineering

ILLINOIS, UNIVERSITY OF

Urbana, Illinois 61801 (35,307 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	110	40
Nuclear Physics	–	–	13
Nuclear Chemistry	–	X	1
Radiochemistry	–	X	2

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	50	20 hr	75%	T + 3375/9
Teaching assistant	20	20 hr	75%	T + 3375/9
Fellow and trainee	15	0	100%	T + 2400/X up

Special Facilities and Programs: Facilities: Nuclear Reactor Laboratory, Materials Research Laboratory, Physics Research Laboratory, Radioactive Waste Disposal Lab, Semiconductor Detector Lab, Radiation Shielding Facilities, Nuclear Metallurgy Lab, Radiochemistry Laboratory, Thermonuclear Laboratory, Materials Research Laboratory, Heat Transfer and Turbulence Lab. Areas of Specialization: Reactor System Dynamics, Spatially Dependent Reactor Kinetics, Reactor Statics, Neutron Pulse Propagation, Fission Physics, Neutron Physics, Nuclear Physics, Elementary Particle Physics, Nuclear Fuels, Shielding, Radiation Damage, Reactor Heat Transfer, Bubble Dynamics, Two-Phase Flow, Structure of Turbulent Flows, Environmental Radiation, Direct Energy Conversion, Plasma Physics, Activation Analysis, Radiochemistry, Radiation Chemistry, Mass Transport, Health Physics, Reactor Safeguards, Fusion Systems, Design Optimization, Nuclear Fuel Management. The university is a member of Argonne Universities Association.

For Additional Information: J. P. Hummel, Department of Chemistry
J. H. Smith, Department of Physics
M. E. Wyman, Nuclear Engineering Program

INDIANA STATE UNIVERSITY

Terre Haute, Ind. 47809 (15,406 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	10	50%	10-12 hr	T + 1800-2300/X

For Additional Information: C. Parrish, Department of Chemistry
J. Swiz, Department of Physics

INDIANA UNIVERSITY

Bloomington, Ind. 47401 (31,280 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	–	–	26

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	27	10-15 hr	12 hr	F + 3600/12
Teaching assistant	30	10-15 hr	12 hr	F + 3000/10
Fellow	3	–	16 hr	F + 3000/10

Special Facilities and Programs: The university is a member of Argonne Universities Association.

For Additional Information: R. G. Newton, Department of Physics

INDIANA UNIVERSITY OF PENNSYLVANIA

Indiana, Pa. 15701 (10,129 stud; coed; PhD; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	—	3	—
Nuclear Chemistry	—	1	—
Health Physics	—	1	—

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	6	6-8 hr	8 hr	2705/X

Special Facilities and Programs: The Van de Graaff accelerator laboratory is used extensively by undergraduates in various courses. The laboratory is designed as a teaching as well as research facility.

For Additional Information: Richard E. Berry, Department of Physics

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY

Ames, Iowa 50010 (19,628 stud; coed; PhD, general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	—	X	X
Nuclear Physics	—	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	22 hr	11 hr	290 up/1*
Teaching assistant	6	22 hr	11 hr	290 up/1*
Fellow	2	0	15 hr	T + 2200 up/12

** Fee reduction*

Special Facilities and Programs: The university is a member of Argonne Universities Association.

For Additional Information: Glenn Murphy, Department of Nuclear Engineering

IOWA, UNIVERSITY OF

Iowa City, Iowa 52240 (20,709 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	—	X	—

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	X	100%	4000/12*
Teaching assistant	X	X	100%	4000/12*
Fellow	X	X	X	3000/9
Trainee	X	X	X	T,D + 2400-2800/X

** Out-of-state tuition and fees reduced to resident rate.*

Special Facilities and Programs: Nuclear medical technology (4-year program). Nuclear science and technology (MS). The university is a member of Argonne Universities Association.

For Additional Information: J. O. Osburn, Department of Chemical Engineering

JOHN CARROLL UNIVERSITY

Cleveland, Ohio 44118 (3,785 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant (C)	8	50%	50%	T + 2600/9
Teaching assistant (P)	7	50%	50%	T + 2600/9

For Additional Information: H. C. Nash, Department of Physics

KANSAS STATE COLLEGE

Pittsburg, Kan. 66762 (5,218 stud; MS; general)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: A formal arrangement exists with the Kansas State University Nuclear Engineering Department whereby a student can complete the basic physics, chemistry, mathematics, and certain pre-engineering courses at Kansas State College to enter the Nuclear Engineering program at Kansas State University. This is a 3-2 program with a BS in Physics awarded after 3 years at Kansas State College and 1 year at Kansas State University and a BS in Nuclear Engineering awarded at Kansas State University at the end of 5 years. A student can transfer into the Kansas State University Nuclear Engineering program after 2 years at Kansas State College to complete a Nuclear Engineering BS in 4 years.

For Additional Information: Bruce Daniel, Department of Physics

KANSAS STATE TEACHERS COLLEGE

Emporia, Kan. 66801 (6,506 stud; coed; MS; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	–
Nuclear Chemistry	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	4	15 hr	9 hr	1500/9
Fellow	1	0	9 hr	1500/9

Special Facilities and Programs: Dual degree, five-year program with the Nuclear Engineering Department at Kansas State University (BA in Physics or Chemistry and BS in Nuclear Engineering).

For Additional Information: Charles Creager, Physical Science Division

KANSAS STATE UNIVERSITY

Manhattan, Kan. 66502 (15,158 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	93	46	24

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant*	12	40%	12 hr	3000-4200/12
Fellow	1	0	100%	X

* *Foreign students eligible. Resident tuition charged.*

Special Facilities and Programs: Applied radiation shielding; NSF/AEC sponsored summer institutes; neutron activation analysis; radiation effects; radiation chemistry; industrial isotopes applications; applied mathematical reactor analysis; nuclear fuel processing; neutron spectrometry; nuclear-electric power systems. The university is a member of Argonne Universities Association.

For Additional Information: Richard E. Faw, Department of Nuclear Engineering

KANSAS, UNIVERSITY OF

Lawrence Kan. 66044 (21,359 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	20	12
Health Physics	–	23	22

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	20 hr	10 hr	3000/9

Special Facilities and Programs: Cryogenics; high-speed photography; high temperature chemistry; radiation biophysics. Summer institute in radiation biology. The university is a member of Argonne Universities Association.

For Additional Information: Russell B. Mesler, Department of Chemical and Petroleum Engineering
Edward Shaw, Department of Radiation Biophysics

KENT STATE UNIVERSITY

Kent, Ohio 44242 (19,755 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X
Nuclear Chemistry	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	20 hr	15 hr	3850-5720/12
Teaching assistant	26	20 hr	15 hr	3330-5200/12
Teaching fellow	7	20 hr.	15 hr	4530-5600/12
Fellow	3	0	15 hr	2400-2800/9

Special Facilities and Programs: We are members of a user's group and utilize particle accelerators such as the 184 inch synchrocyclotron at Berkeley, the cyclotron at the University of Maryland, the synchrocyclotron at Columbia University Nevis Laboratory, the Indiana University Cyclotron Facility, and the Los Alamos Meson Physics Facility. Research areas: Nuclear magnetic resonance, Mössbauer effect studies, energetic neutron and charged particle spectrometry, interaction of nuclear radiation with matter, and fluid-bed studies of pollutants and radioactive gases.

For Additional Information: Richard Madey, Department of Physics

KENTUCKY, UNIVERSITY OF

Lexington, Ky. 40506 (21,874 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	12	1
Nuclear Physics	–	15	22
Nuclear Chemistry	–	X	X
Radiochemistry	X	X	X
Health Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	20 hr	9 hr	3050-3350/10
Teaching assistant	16	18 hr	9 hr	3050-3350/10
Fellow	3	none	12 hr	2700-3100/10

Foreign students eligible

Special Facilities and Programs: Nuclear Engineering: The nuclear engineering research programs emphasize the area of nuclear reactor safety, specifically the core cooling problems during power excursions or loss of coolant and the area of radioactive waste disposal. The facilities at Oak Ridge National Laboratory are used routinely for reactor experiments. Nuclear Physics: Special neutron scattering facility, nanosecond pulsed beam, T.O.F. spectroscopy for reaction studies producing neutrons and for study of neutron scattering from various targets (elemental or isotopic materials), neutron polarization studies; Studies of nuclear spectroscopy through gamma-ray decay of nuclear levels; Charged particle scattering from elemental or isotopic targets in differentially pumped scattering chamber; Activation analysis; X-ray fluorescence from proton sample excitation. The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: Fletcher Gabbard, Department of Physics and Astronomy
O. J. Hahn, Department of Mechanical Engineering

LAMAR UNIVERSITY

Beaumont, Texas 77710 (10,815 stud; coed; PhD; general)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Wendell C. Bean, Department of Electrical Engineering

LOMA LINDA UNIVERSITY

Riverside, Calif. 92354 (3,690 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Nuclear physics option available in programs leading to the BS in either Physics or Engineering Physics.

For Additional Information: James W. Riggs, Jr., Department of Physics

LOUISIANA STATE UNIVERSITY

Baton Rouge, La. 70803 (23,197 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	13	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research and teaching assistant	12	16 hr	10 hr	T + 2200-3600/9

Foreign students eligible
Non-resident fees waived. Partial withholding tax waived.

Special Facilities and Programs: Nuclear structure studies, activation analysis, industrial nuclear applications, gamma-ray spectrometry, reactor analysis, radiation dosimetry, radiation shielding (Variety of codes obtained from RSIC are operational and in use.), industrial radiography. A nuclear option is offered for the BS in Physics and the BS in Industrial Technology. The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: William F. Curry, Nuclear Science Center

LOUISIANA STATE UNIVERSITY

New Orleans, La. 70122 (12,448 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X
Radiochemistry	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	10	20 hr	9 hr	3000/9
Teaching assistant	15	12 hr	9 hr	2500/9

Special Facilities and Programs: Active research and training in Mössbauer spectroscopy, research and training in theoretical nuclear physics, option in nuclear engineering, summer institute on the energy crisis—special interest in nuclear power, C-14 dating laboratory. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Fritz Dohse, Department of Engineering Sciences
Mary L. Good, Department of Chemistry

LOUISIANA TECH UNIVERSITY

Ruston, La. 71270 (7,724 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Charles A. Kilgore, Nuclear Center

LOUISVILLE, UNIVERSITY OF

Louisville, Ky. 40208 (10,883 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	1	–	12 hr	T + 3000/9
Teaching assistant	9	12 hr	12 hr	T + 2950/9

Special Facilities and Programs: Angular correlation of gamma-rays; Mössbauer studies, NMR and EMR studies; positron annihilation; nuclear medicine, post-graduate; radio-tracer studies in biological systems (approximately 25 groups in Health Sciences Center). The university is a member of Oak Ridge Associated Universities.

For Additional Information: A. Jacobson, Department of Radiology
M. Schwarz, Department of Physics

LOWELL TECHNOLOGICAL INSTITUTE

Lowell, Mass 01854 (6,421 stud; coed; PhD; prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	–
Nuclear Physics	X	X	X
Health Physics	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	18-20 hr	12 hr	3600/12
Teaching assistant	22	18-20 hr	6-9 hr	T + 3000/10

Foreign students eligible

Special Facilities and Programs: Much of current research is in areas associated with fast breeder reactor development and includes fast neutron cross section measurements, pulsed fast neutron experiments, spectrometer development, central worth, breeding blanket and reflector optimization, and fast reactor heterogeneity effects. Other areas of activity are low-energy nuclear physics, alpha particle and activation analysis, simplified methods for solution of the neutron transport equation, radioactive aerosols, air analysis, X-ray production, environmental analysis, and applied health physics. Major facilities are a 5.5 MeV Van de Graaff accelerator which produces intense, subnanosecond ion bursts and a 1 Mw swimming pool reactor.

For Additional Information: Gunter Kegel, Department of Physics and Applied Physics
Kenneth Skrable, Department of Radiological Sciences

LOYOLA MARYMOUNT UNIVERSITY

Los Angeles, Calif. 90045 (5,359 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: A course in nuclear physics and an advanced laboratory course emphasizing radiation physics are offered for senior majors planning to enter graduate school. The Department of Mechanical Engineering offers a graduate

course in nuclear engineering as a part of the MS program in Electrical Engineering, Mechanical Engineering, and Civil Engineering.

For Additional Information: Joseph P. Callinan, Department of Mechanical Engineering
William T. Kaune, Department of Physics

MAINE, UNIVERSITY OF

Orono, Maine 04473 (9,668 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	13	6-8 hr	12 hr	[illegible]00/9

Special Facilities and Programs: Deformed nuclei (theoretical), soft X-rays, environmental radiation measurements.

For Additional Information: Henry O. Hooper, Department of Physics

MANHATTAN COLLEGE

Bronx, N.Y. 10471 (4,360 stud; men; MS; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Radiological Health	X	—	—

Special Facilities and Programs: A nuclear science sequence (6 credits) is provided in the Mechanical Engineering Department. Two courses which include labs are offered in nuclear reactor physics. Facilities and courses are used solely by undergraduates. The nuclear program is geared to prepare students for graduate study in nuclear engineering. The special feature of our program is our ZPR which is an excellent tool for instructing students in reactor behavior.

For Additional Information: C. Leonard O'Connor, Department of Radiological and Health Sciences
Brother Gabriel Kane, Department of Physics
John M. Tuohy, Department of Mechanical Engineering

MARYLAND, UNIVERSITY OF

College Park, Md. 20742 (34,509 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	X	X	X
Nuclear Chemistry	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	13	20 hr	10 hr	3000-3500/9
Teaching assistant	15	20 hr	10 hr	T + 2800-3300/9

Special Facilities and Programs: Engineering research in reactor analysis, radiation chemistry of polymers, and activation analysis. It is based on a 250 keW reactor, a 25,000 curie Cobalt 60 source, and a 600 keV electron Van de Graaff accelerator. Experimental research in nuclear physics is based on the positive ion Van de Graaff accelerators and the 150 MeV cyclotron. These are active research programs in experimental and theoretical high energy physics. Nuclear chemistry and radiochemistry research in environmental and geological sciences. The university is a member of Oak Ridge Associated Universities.

For Additional Information: H. Holmgren, Department of Physics
F. J. Munno, Department of Chemical Engineering
V. Viola, Department of Chemistry

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Cambridge, Mass. 02139 (7,834 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	—	X	X
Nuclear Engineer—X			

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	28	30 hr	50%	2658/4½
Teaching assistant	19	18 hr	75%	T + 1350/4½
Fellow	3	—	100%	V
Trainee	8	—	100%	V

For Additional Information: Edward A. Mason, Department of Nuclear Engineering

MASSACHUSETTS, UNIVERSITY OF

Amherst, Mass. 01002 (23,710 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	–	–	X
Nuclear Physics	–	2	13

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	20	20 hr	100%	350/1
Teaching assistant	34	20 hr	100%	3200/9
Fellow	2	none	100%	2700/12

Special Facilities and Programs: Electron scattering at intermediate energies at M.I.T. and N.B.S. Reactions at Yale and ORNL. Nuclei far off the beta-stability line at UNISOR. Beta-gamma angular correlations on campus. The university is a member of Associated Universities, Inc., and the UNISOR Consortium.

For Additional Information: J. Marcus, Department of Chemical Engineering
J. E. Roberts, Department of Chemistry
K. Sastry, Department of Physics

MEMPHIS STATE UNIVERSITY

Memphis, Tenn. 38152 (20,104 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	X	X	X
Teaching assistant	X	X	X	X

Foreign students eligible

Special Facilities and Programs: The university is a member of Oak Ridge Associated Universities.

For Additional Information: John C. Guyon, Department of Chemistry
C. C. Ijams, Department of Physics
Roger E. Nolte, College of Engineering

MERRIMACK COLLEGE

North Andover, Mass. 01845 (2,049 stud; coed; BS; general)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Nuclear courses are offered for the undergraduate program in engineering physics.

For Additional Information: Hudo-Long Fann, Department of Physics

MIAMI, UNIVERSITY OF

Coral Gables, Fla. 33124 (14,381 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X
Health Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (P)	8	15 hr	6-12 hr	T + 2500/9
Teaching assistant (P)	11	15 hr	6-12 hr	T + 2500/9

Special Facilities and Programs: A doctoral interdepartmental program is available in radiological health, radiological physics, or nuclear medicine. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Sharad R. Amtey, Division of Nuclear Medicine
Philip W. Carter, Department of Physics
Maxwell Dauer, Division of Radiation Physics

MICHIGAN TECHNOLOGICAL UNIVERSITY

Houghton, Mich. 49931 (5,018 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	80	50%	9 hr	3000/9

Special Facilities and Programs: Michigan Tech offers a variety of nuclear courses and research areas between the various curriculums to provide science and engineering students the opportunity to construct an informal, elective nuclear minor. The student's departmental advisor will assist him in choosing the appropriate courses to match his particular need. It is the concept of this program to prepare a student to understandably relate his professional major to the nuclear fields.

The university is excellently equipped to provide training and research opportunities in this area. Some of the major items are a neutron generator, liquid scintillation counter, lithium drifted germanium gamma ray spectrometer, and a large variety of radiation sources, and detectors.

For Additional Information: C. E. Mandeville, Department of Physics

MICHIGAN, UNIVERSITY OF

Ann Arbor, Mich. 48104 (36,646 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	16½	15-70 hr	100%	2400-3840/12*
Teaching assistant	2¼	10 hr	100%	500-2000/9
Fellow	8½	0	100%	T + 2400-2760/12
Trainee	7	0	100%	T + 2400-2760/12

Foreign students eligible for all appointments except trainee
** Plus in-state tuition*

Special Facilities and Programs: Neutron inelastic spectroscopy in solids, radiation damage in semiconductors, laser-plasma research and instructional laboratories, fluid flow and heat transfer equipment, fast neutron spectrometry, neutron radiography, and medical diagnostic scanning spectrometers. The university is a member of Argonne Universities Association.

For Additional Information: William Kerr, Department of Nuclear Engineering

MIDDLE TENNESSEE STATE UNIVERSITY

Murfreesboro, Tenn. 37130 (9,269 stud; coed; PhD; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	–	–

For Additional Information: J. E. Wiser, Department of Chemistry and Physics

MISSISSIPPI STATE UNIVERSITY

Mississippi State, Miss. 39762 (11,001 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	1	50%	12 hr	350/1

Special Facilities and Programs: Areas of specialization: Radiation shielding, neutron activation analysis, neutron transport theory and radiative transfer, radiation detection and measurement, nuclear reactor design and analysis, and pulsed neutron measurements. The university is a member of Oak Ridge Associated Universities.

For Additional Information: E. I. Howell, Department of Physics
J. I. Paulk, Department of Nuclear Engineering

MISSISSIPPI, UNIVERSITY OF

University, Miss. 38677 (7,995 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–
Nuclear Physics	–	X	–
Nuclear Chemistry	–	–	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	4	15 hr	9 hr	2600/9*

** Plus remission of $600 non-resident fee where applicable.*

Special Facilities and Programs: Nuclear spectroscopy, radiation damage studies, neutron time of flight, radiation chemistry studies, application of radioisotope techniques to pharmaceutical and biological sciences, radiopharmacy, radioimmunoassay, Radiation Research Section, Institute of Applied Science and Mathematics. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Russell E. Aven, Department of Chemical Engineering

MISSOURI, UNIVERSITY OF

Columbia, Mo. 65201 (23,973 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	138*	47	8

* *With Nuclear Engineering option in ChE, EE, and MAE.*

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	9	25-50%	50-75%	1700-3600/9
Fellow	2	none	100%	3000/12
Trainee (AEC)	1	none	100%	2400/12

Various part-time and full-time positions available at the Missouri Research Reactor.

Special Facilities and Programs: Neutron activation analysis: forensic applications to compare physical evidence samples including gunshot residue, hair, thread, paint, and blood; identification of industrial waste pollutants in air and water. Reactor kinetics and control: measurement of auto- and cross-correlation functions from which the power spectral density and transfer function can be deduced; direct digital control of reactors by mini-computers. Medical applications of nuclear techniques: tracer experiments on neutrophil kinetics of hemodialysis patients; trace elements in skin carcinomas; neutron radiography, thermal and fast; neutron and gamma-ray therapy and dosimetry. Neutron physics: cross section measurements at intermediate neutron energies; neutron interaction with piezoelectric crystals; neutron wave propagation. Applications of transport theory: a determination of slip coefficients; heat transfer and shear stress for rarified gases; migration of aerosols. The university is a member of Argonne Universities Association.

For Additional Information: Walter Meyer, Department of Nuclear Engineering

MISSOURI, UNIVERSITY OF

Rolla, Mo. 65401 (5,219 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	48	29	5
Nuclear Physics	X	X	X
Nuclear Chemistry	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	40%	12 hr	3500/9
Teaching assistant	2	40%	12 hr	3500/9

Special Facilities and Programs: Liquid nitrogen cooled irradiation chamber for reactor, radiation effects in semiconductors, radiation effects on polymerization rates in organic materials, computer simulation of radiation damage, thermal effects from power plants, Monte Carlo techniques for shielding, materials for fusion reactors, electromagnetic confinement of plasma, and electrostatic confinement of plasma. The university is a member of Argonne Universities Association.

For Additional Information: Ray Edwards, Department of Nuclear Engineering

MONTANA STATE UNIVERSITY

Bozeman, Mont. 59715 (7,898 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X
Radiochemistry	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	0-20 hr	100%	3000-3800/12
Teaching assistant	X	12-18 hr	50%	2900/9

Foreign students eligible

Special Facilities and Programs: Doctoral research in radiation chemistry, radiation immunobiology, low energy nuclear structure, and radiological health engineering. Summer institute in nuclear and instrumental chemistry for high school teachers. The university is a member of Associated Western Universities.

For Additional Information: J. R. Amend, Department of Chemistry
F. D. Lee, Department of Physics

MURRAY STATE UNIVERSITY

Murray, Ky. 42071 (7,337 stud; coed; MS; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	X	–	–
Nuclear Physics	23	11	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	13-20 hr	9-12 hr	1800-2700/9
Teaching assistant	8	13-20 hr	9-12 hr	1800-2700/9

Special Facilities and Programs: Stopping powers of heavy ions in solids and gases, high resolution nuclear spectroscopy, and angular correlations. Special radioisotope course for industrial personnel.

For Additional Information: James M. Kline, Department of Physics and Astronomy

NEBRASKA, UNIVERSITY OF

Lincoln, Neb. 68508 (21,581 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	15	33½%	12 hr	3450/9
Teaching assistant	28	33½%	12 hr	3450/9

Special Facilities and Programs: A nuclear engineering option is available for the MS in Mechanical Engineering. The Omaha Veterans Administration Hospital TRIGA reactor is used as a critical reactor when required.

For Additional Information: Dayton D. Wittke, Department of Mechanical Engineering

NEVADA, UNIVERSITY OF

Reno, Nev. 89507 (7,140 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Nuclear courses associated with power generation are offered as an option for the MS in Electrical Engineering.

For Additional Information: D. F. Dickinson, Department of Electrical Engineering
R. A. Manhart, Department of Electrical Engineering

NEW HAMPSHIRE, UNIVERSITY OF

Durham, N.H. 03824 (10,921 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	20 hr	9 hr	2800/9
Teaching assistant	X	9 hr	9 hr	2800/9
Fellow	X	–	100%	T + 2800/9

For Additional Information: Chairman, Department of Physics

NEW MEXICO INSTITUTE OF MINING AND TECH

Socorro, N. Mex. 87801 (894 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	13	20 hr	9-12 hr	4000/12
Teaching assistant	5	20 hr	9-12 hr	2400/9

No nonresident fees

Special Facilities and Programs: Natural radioactivity in the atmosphere, tritium concentration in water, chemistry of uranium compounds, nuclear astrophysics, and cosmic-rays. The university is a member of Associated Western Universities.

For Additional Information: Marx Brook, Department of Physics

NEW MEXICO STATE UNIVERSITY

Las Cruces, N. Mex. 88003 (9,221 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	20 hr	9 hr	2500/X
Teaching assistant	17	20 hr	9 hr	2700/X
Fellow	5	–	–	2900/X

Special Facilities and Programs: In cooperation with White Sands Missile Range the reactor may be used as well as the steady-state neutron generator. Neutron activation studies, electron interactions with nuclei, and radiation biology. The university is a member of Associated Western Universities.

For Additional Information: Ralph Dressel, Department of Physics
Quentin C. Ford, Department of Mechanical Engineering
Albert Richardson, Department of Chemistry

NEW YORK, STATE UNIVERSITY OF

Buffalo, N.Y. 14214 (20,963 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	–
Nuclear Physics	–	X	X
Radiation Biology	–	X	X
Radiation Protection	X	–	–
Nuclear Medicine (Res.)			

Teaching and research assistantships are available to all qualified students in the Department of Engineering Science

Special Facilities and Programs: Special courses concerned with specific areas of nuclear technology or applications of nuclear techniques are offered by a number of departments including chemistry, geological sciences, anthropology, biology, oral biology, and nuclear medicine.

For Additional Information: G. Brink, Department of Physics
A. K. Bruce, Department of Biology
I. H. Shames, Department of Engineering Science

NEW YORK, STATE UNIVERSITY OF (MARITIME COLLEGE)

Bronx, N.Y. 10465 (803 stud; men; MS; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Science	X	–	–

Special Facilities and Programs: In addition to the course work in nuclear science, our students receive a thorough grounding in power plant engineering. The work is especially directed toward the operation and analysis of marine power plants of all types.

For Additional Information: R. Thomas Cerny, Director of Admissions
Joseph D. Longobardi, Department of Science

NEWARK COLLEGE OF ENGINEERING

Newark, N.J. 07102 (4,825 stud; coed; PhD; prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: A nuclear engineering option is available in all the engineering departments.

For Additional Information: B. H. Stevenson, Department of Physics

NORTH CAROLINA STATE UNIVERSITY

Raleigh, N.C. 27607 (14,532 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	134	41	22
Health Physics	–	4	–
Physics-Nuclear Related	–	–	11

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	11	20 hr	9 hr	V 300-600/1
Teaching assistant	6	20 hr	9 hr	1350-2700/9
Fellow (Federal)	2	none	15 hr	2400-2800/12
Trainee (AEC)	6	none	15 hr	2600-3300/12

Foreign students eligible for assistantships only

Special Facilities and Programs: Course programs in the Nuclear Engineering Department are intended to meet career interests in Radiation Research and Applications: Effects on Materials, Detection and Control, Radioisotopes, and Radiological Safety; and Reactor Theory, Design and Measurement: Transport Theory, System Analysis, Energy Transfer and Conversion, and Reactor Kinetics. A variety of interdisciplinary programs, including mechanics, materials, economics, ecology, and radiological safety are available in cooperation with other departments. Current research topics include: Reactor Boiling Detection, Computer Simulation and Radiation Effects, Radiation Transport Research, Fission Product Diffusion in Solids, Monte Carlo Applications, Fission Product Absorption on Graphite, Radioisotope Gauging, Neutron Dosimetry, Unification of Theory of Neutron Multiplying Systems, Activation Analysis, Reactor Noise Measurements, Positron Lifetimes in Irradiated Solids, Tritium Diffusion in Fuel Claddings, and Fuel Cycle Analysis. The Department occupied the new Nuclear Engineering building in 1972 which includes a 1 MW pulsing PULSTAR reactor, classrooms, and laboratories for teaching and research. A co-op program to provide work assistance and financial support for MS graduate candidates was instituted in 1972. The Department currently has nine full-time faculty, 50 graduate students, and 110 undergraduate students. The university is a member of Oak Ridge Associated Universities.

For Additional Information: J. T. Lynn, Department of Physics
C. E. Stewert, Department of Nuclear Engineering

NORTH CAROLINA, UNIVERSITY OF

Chapel Hill, N.C. 27514 (19,224 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	4
Public Health	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	5	50%	9-12 hr	3600/12

Special Facilities and Programs: Triangle Universities Nuclear Laboratory (at Duke) has a cyclotron and tandem Van de Graaff accelerator (7.5 MV on terminal) which can be combined to produce beams of 30 MeV protons. 3 and 4 MeV Van de Graaff accelerators are also available, the 3 MeV machine with a high-resolution capability. The associated equipment consists of two DDP-224 computers, a polarized ion source (Lamb-shift type) and assorted electronics.

The experimental work involves studies of X-ray production by protons, polarization studies involving nuclear reactions and scattering, He-3 induced reactions, and isobaric analog states.

The theoretical work in atomic and nuclear physics is closely associated with the experimental work.

The Triangle Universities Computation Center has computing facilities based on the IBM 370/165.

The university is a member of Oak Ridge Associated Universities.

For Additional Information: E. J. Ludwig, Department of Physics
S. M. Shafroth, Department of Physics

NORTH DAKOTA STATE UNIVERSITY

Fargo, N.D. 58102 (7,257 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	2	4	–
Health Physics	–	23	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant (P)	7	25%	9 hr	T + 2250/9
Teaching assistant*	3	20 hr	12 hr	2400/12
Fellow*	2	none	15 hr	3000/12
Trainee (P)	1	50%	12 hr	V

Foreign students eligible

* *Department of Pharmaceutical Chemistry and Bionucleonics*

Special Facilities and Programs: Physics: gamma-gamma correlations in studies of nuclear excited state properties; applications to study of internal fields of solids, macromolecules, and viscous liquids; field ion microscopy studies of insulating thin films. Accelerator at nearby Concordia College available for activation analysis and solid state channeling studies. Much work on biological effects of radiation done at U. S. Radiation and Metabolism Laboratory located on campus. Pharmaceutical Chemistry and Bionucleonics: Complete training program in Radiological Health. Courses also available in nuclear physics, nuclear chemistry, and nuclear engineering.

For Additional Information: James C. Glass, Department of Physics
James P. Vacik, Department of Pharmaceutical Chemistry and Bionucleonics

NORTHEASTERN UNIVERSITY

Boston, Mass. 02115 (34,051 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Melvin Mark, Dean of Engineering

NORTHERN COLORADO, UNIVERSITY OF

Greeley, Colo. 80631 (13,396 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant (B,P)	4	6 hr	6-9 hr	2500/9

For Additional Information: Wallace Aas, Department of Physics
Bert Thomas, Department of Biology

NORTHERN ILLINOIS UNIVERSITY

DeKalb, Illinois 60115 (23,548 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	15	10-20 hr	9 hr	2880/9

Registration and out-of-state tuition waived.

Special Facilities and Programs: Nuclear decay schemes using beta decay excitation and fast coincidence counting for studying gamma-ray cascades. Nuclear energy levels using various neutron capture gamma-ray spectra obtained at the ANL CP5 research reactor. Particle reactions using the tandem Van de Graaff at ANL.

For Additional Information: D. L. Bushnell, Department of Physics

NORTHWESTERN UNIVERSITY

Evanston, Illinois 60201 (14,418 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	16	18	13
Health Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	doct. res.	research	T + 3360/9
Tutorial assistant	1	25%	100%	T + 3900/9
Scholar	3	none	100%	T
Fellow	3	none	100%	T + 3000/12
Trainee	X	none	100%	T + 2800/12

Foreign students eligible for all except Trainee

Special Facilities and Programs: Nuclear reactor physics methods (Finite Elements), fast reactor safety, liquid metal heat transfer (transient), fast reactor core design; neutron detection, health physics, environmental radiation, and radiation health. The university is a member of Argonne Universities Association.

For Additional Information: Herman Cember, Department of Civil Engineering
Donald T. Eggen, Department of Engineering Sciences

NOTRE DAME, UNIVERSITY OF

Notre Dame, Ind. 46556 (8,575 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	–	X	X
Radiation Chemistry	–	–	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (P)	11*	20 hr	10 hr	4680-4905/9
Research assistant (N)	2*	20 hr	10 hr	4680-4905/9
Research assistant†	3*	100%	3-6 hr	300/1
Teaching assistant (P)	43	10 hr	10 hr	T + 2400/12
Teaching assistant (N)	2	10 hr	10 hr	T + 2700-3000/12
Fellow (P)	7	none	12 hr	T + 2400/12

** Foreign students eligible*
† Radiation Laboratory

Special Facilities and Programs: Nuclear Engineering: Numerical Techniques; Shielding Analysis; Economics of Nuclear Power; Interactions of Social Demands and Technological Capabilities. Nuclear Physics: Violation of Isospin selection rules in nuclear reactions; reactions with polarized ions; nuclear resonance fluorescence; particle-gamma angular correlations; precision Q-value measurements; investigation of decay schemes by beta and gamma-ray spectroscopy; gamma-gamma angular correlations; measurements of short nuclear lifetimes; and Coulomb excitation. Radiation Chemistry: The Radiation Laboratory, funded by the AEC, is a University Institute for studies of effects of radiation. Participating departments include Chemistry, Biology, Physics, Chemical Engineering, Metallurgical Engineering and Materials Science, and Electrical Engineering. The university is a member of Argonne Universities Association.

For Additional Information: John Lucey, Department of Aero and Mechanical Engineering
John L. Magee, Radiation Laboratory
J. W. Mihelich, Department of Physics

OCCIDENTAL COLLEGE

Los Angeles, Calif. 90041 (1,826 stud; coed; MS; general)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: Chairman, Department of Physics

OHIO STATE UNIVERSITY

Columbus, Ohio 43210 (45,963 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	X
Nuclear Physics	X	X	X
Nuclear Chemistry	X	X	X
Radiochemistry	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (N)	4	50%	12 hr	T,F + 2250/9
Teaching assistant (N)	4	50%	12 hr	T,F + 2250/9
Fellow	3	none	100%	T,F + 2400/12

Foreign students eligible

Special Facilities and Programs: Program includes graduate nuclear engineering program (MS and PhD) and undergraduate nuclear engineering option programs. Graduate program emphasizes nuclear power, nuclear instrumentation, and uses of nuclear radiation in science and industry. The university is a member of Argonne Universities Association.

For Additional Information: Robert F. Redmond, Department of Nuclear Engineering

OKLAHOMA, UNIVERSITY OF

Norman, Okla. 73069 (19,494 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	3	50%	12 hr	2592/12

Special Facilities and Programs: The BS program specializes in nuclear power engineering. Research areas are fuel management, safeguards, and shielding. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Charles Bert, School of Aerospace, Mechanical, and Nuclear Engineering
Helmut Fishbeck, Department of Physics

OLD DOMINION UNIVERSITY

Norfolk, Va. 23508 (11,458 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	50%	50%	2250/9

Special Facilities and Programs: The broad based, core engineering program prepares undergraduates for graduate study in nuclear engineering. There are energy conversion and power reactor systems emphasis areas within the Mechanical Engineering Department. Nuclear energy considerations are a part of the undergraduate program in mechanical engineering. A nuclear engineering concentration is possible at the master's level, but is not available in the PhD program.

For Additional Information: C. L. Adams, Director of Research, ODU Research Foundation
D. S. Ousterhout, Acting Dean of the School of Engineering
A. S. Roberts, Assistant Dean of the School of Engineering

OREGON STATE UNIVERSITY

Corvallis, Ore. 97331 (15,184 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	38	10	2
Nuclear Chemistry	—	9	4
Radiation Biology	—	2	7
Nuclear Engr. Tech.	6	—	—

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	9	8-16 hr	12 hr	3000-4500/11
Teaching assistant	10	8-16 hr	12 hr	2600-3200/9
Fellow	3	15 hr	16 hr	3100/11

Special Facilities and Programs: Areas of specialization: neutron activation analysis, neutron radiography, nuclear shielding, nuclear fuel cycle analysis, nuclear fission mechanisms, photoelectron spectroscopy, radiation chemistry, effects of radiation on neutral systems, cell radiation biology, nuclear reactions, etc. Special facilities: high-speed neutron radiography facility, 50 Mw power reactor simulator, large animal facility for radiotracer research. Special program: the nuclear engineering technology BS curriculum is a four-year program specially designed to train personnel for managerial tasks in nuclear power plants and other nuclear operations.

For Additional Information: Larry Schector, Department of Physics
Roman A. Schmitt, Department of Chemistry
Bernard I. Spinrad, Department of Nuclear Engineering
C. H. Wang, Director of the Institute of Nuclear Science and Engineering and the Radiation Center

OREGON, UNIVERSITY OF

Eugene, Ore. 97403 (15,432 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	—	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research appointment	10	40 hr	12 hr	2600/9
Teaching assistant	22	15 hr	12 hr	2600/9
Research associate	2	40 hr	—	9000/12

Special Facilities and Programs: Research areas: Internal ionization in beta decay, radiationless transition probabilities, photoelectric cross sections, fine structure interference in Lyman-beta radiation formed by beam-foil excitation, neutron-induced charged particle interactions, threshold neutron spectra, neutron scattering and polarization, lifetime measurement with DSAM technique, direct reaction effects in the (deuteron, gamma) reaction, the (neutron, gamma) interaction and semi-direct capture theory, and Coulomb excitation and quasiparticle-photon coupling.

For Additional Information: David K. McDaniels, Department of Physics

PACIFIC UNION COLLEGE

Angwin, Calif. 94508 (1,885 stud; coed; MS; general)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: D. E. Martz, Department of Physics

PENNSYLVANIA STATE UNIVERSITY

University Park, Pa. 16802 (37,778 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	38	97	18
Nuclear Physics	–	9	10
Nuclear Technology* (13)			

* *Associate Degree*

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (N)	16	20 hr	5-7 hr	3772/12
Teaching assistant (N)	4	20 hr	5-7 hr	3772/12
Trainee (AEC)	5	20 hr	5-7 hr	D + 2400-2800/12

Special Facilities and Programs: TRIGA Mark III research reactor. Summer Institute on Radiation and the Environment. Nuclear Concepts Summer Institute.

For Additional Information: Warren F. Witzig, Department of Nuclear Engineering

PENNSYLVANIA, UNIVERSITY OF

Philadelphia, Pa. 19104 (19,614 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	16

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research fellow	59	10-20 hr	75%	2950/9
Teaching fellow	18	10-20 hr	75%	2950/9
Fellow	9	–	100%	2000-3000/9

Special Facilities and Programs: Nuclear structure research with Tandem. Astrophysical nucleosynthesis research with Tandem. The university is a member of Associated Universities, Inc., and the National Accelerator Laboratory.

For Additional Information: Robert I. Harker, Department of Geology
Roy K. Middleton, Department of Physics

PRINCETON UNIVERSITY

Princeton, N.J. 08540 (5,522 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	50%	100%	T + 2300-2700/10
Teaching assistant	X	50%	100%	T + 3200-3800/10
Fellow	X	–	–	T + 2000/9

Special Facilities and Programs: A graduate program in fusion reactor technology is available in the Department of Chemical Engineering. The program provides opportunities for students interested in the engineering and technological aspects of power generation by means of a controlled thermonuclear reaction to pursue a coordinated program of study and research leading to the MSE and PhD degrees in chemical engineering. The program is closely integrated with the activities of the Plasma Physics Laboratory and has close links with the Center for Environmental Studies of the School of Engineering and Applied Science which is concerned primarily with the environmental impact of energy technologies. The university is a member of Associated Universities, Inc.

For Additional Information: E. F. Johnson, Department of Chemical Engineering
Director of Graduate Studies, Department of Physics

PUERTO RICO, UNIVERSITY OF

Mayaguez, P.R. 00708 (9,048 stud; coed; MS; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–
Health Physics	–	X	–
Radiological Health	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	1	50%	12 hr	250-350/1
Teaching assistant	5	50%	12 hr	250-350/1
Fellow (IAEA)	6	none	12 hr	250-350/1
Fellow (OAS)	2	none	12 hr	250-350/1

Foreign students eligible

Special Facilities and Programs: The university is a member of Oak Ridge Associated Universities.

For Additional Information: E. Theodore Agard, Radiological Health Program
Julio Gonzalo, Nuclear Science Divison, Puerto Rico Nuclear Center
Donald Sasscer, Department of Nuclear Engineering
Frederick Rushford, Information and Education Services, Puerto Rico Nuclear Center

PURDUE UNIVERSITY

West Lafayette, Ind. 47907 (26,461 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	X
Nuclear Physics	–	–	X
Nuclear Chemistry	–	–	X
Radiochemistry	–	–	X
Health Physics	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (A)	5	50%	8-12 hr	3600/12
Teaching assistant (A)	4	50%	8-12 hr	3000/12
Instructor (A)	2	100%	1-6 hr	6000/12
Trainee (PHS) (A,B)	11	0	16 hr	3000/12
Admin. Assistant (A)	5	50%	8-12 hr	280/1
Research assistant (C)	10	V	9 hr	280-300/1
Teaching assistant (C)	no limit	20 hr	12 hr	320/1
Teach. & res. asst. (N)	20	25-50%	12-16 hr	1500-3400/12
Research assistant (P)	11	75%	6 hr	3960/12

Special Facilities and Programs: Department of Bionucleonics: Bionucleonics is a relatively new area of study which involves the application of the principles of nuclear physics to problems in the life sciences. The department is concerned with six major areas of teaching and research: Radioisotope Tracer Methodology, Health Physics (all aspects of radiation protection); Radiation Biology (effects of ionizing and non-ionizing radiation on living systems); Radiopharmaceuticals; Analytical Applications of Radioisotopes; and Environmental Health, including Radiological Health.

Programs are offered leading to the BS degree in Environmental Health and the Master of Science and Doctor of Philosophy degrees in the six areas listed. In addition, a limited number of Post Doctoral appointments are available.

Areas of research include: Radioisotope tracer research in animals, plants and man; The measurement of natural levels of radioactivity in inanimate materials, man, animals and plants and studies of the significance of these levels; Studies of the effect of ionizing and non-ionizing radiation on tissue, enzyme systems, drug metabolism and ion concentration states; Studies of body composition; Development of new instrumental methods; Analytical applications including activation and isotope dilution analyses; Studies of drug metabolism and mechanism of action; Labeled compound synthesis; Biological half-lives of important radionuclides; Applications of isotopes to industrial processes; Applications of isotope tracer techniques to environmental health and toxicology problems; and Dosimetry of ionizing and non-ionizing radiation.

Department of Chemistry: Doctoral programs are available in the Department of Chemistry covering a wide area of nuclear science; radiochemistry, nuclear chemistry and geochemistry. In addition a number of graduate courses in analytical, physical and inorganic chemistry are offered to broaden the educational background of students. Current research interests include meteoritic radiochemistry, the mechanism of binary and ternary fission, spallation and fission reactions at higher energies, particle evaporation, nuclear spectroscopy, heavy ion reactions and the chemistry of the actinide elements.

Department of Nuclear Engineering: Flexible curricula leading to the MS and PhD degrees in Nuclear Engineering are offered. Courses and research opportunities are provided in reactor analysis, reactor dynamics and control, heat transfer, and shielding. Numerous courses and major research efforts are devoted to fast reactor safety, fast reactor engineering, and nuclear fuel management. In addition, several research programs of an interdisciplinary nature are pursued. These are primarily concerned with energy and its utilization, new reactor concepts, and environmental pollution.

A flexible undergraduate program providing training in nuclear engineering is offered by the Department through the Division of Interdisciplinary Engineering Studies. Students are provided with the opportunity to include significant specialization in other engineering disciplines to complement their nuclear engineering training.

Summer workshops on Nuclear Fuel Management have been offered in the past and are planned for the future.

Physics: The research program of the Purdue Nuclear Structure Laboratory deals with experimental investigation of the structure of nuclei and nuclear reaction mechanisms using the new Tandem Van de Graaff Accelerator, operational since August 1969.

Nuclear Structure Studies: (a) The deformations (quadrupole moments of excited nuclear states studied by the reorientation effect in Coulomb excitation); (b) The structure of excited states of nuclei studied by means of multiple Coulomb excitation processes and the measurement of the angular distribution of the de-excitation gamma-rays; (c) Low-lying excited states in neutron deficient isotopes in the "vibrational" and "deformed" region studied by dynamic gamma-ray electron spectroscopy; (d) The structure of excited states of nuclei studied by means of the analogue resonance technique; (e) A program for the assignment of angular momenta quantum numbers to excited nuclear states from observations of the angular distribution of gamma-rays in coincidence with nuclear particles emitted at 180° will be started. The possibility of implanting the recoiling excited nuclei into ferromagnetic lattices in order to measure g-factors will be studied.

Nuclear Reaction Studies: A precise investigation of the (He-3, H-3) reaction is being planned.

Angular Correlation Studies: (a) The determination of g-factors of excited states using the very large magnetic hyperfine fields acting at nuclei of solute atoms in ferromagnetic hosts will be continued; (b) The electromagnetic multipole character of gamma and internal conversion transitions are being studied by means of angular correlation techniques; (c) Short nuclear lifetimes are being measured by using a new application of the centroid shift method with accuracies of 0.5×10^{-12} seconds. Special attention is given to those cases. (d) The program for measuring nuclear matrix elements in beta decay will be continued, and this approach to nuclear structure will be integrated with a number of reaction experiments.

The university is a member of Argonne Universities Association.

For Additional Information: J. E. Christian, Department of Bionucleonics
J. F. Foster, Department of Chemistry
E. C. Fowler, Department of Physics
P. L. Ziemer, Department of Bionucleonics

RENSSELAER POLYTECHNIC INSTITUTE

Troy, N.Y. 12181 (4,660 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	70	68	25

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	X	X	2000/9
Teaching assistant	10	10 hr	X	1000/9
Fellow and trainee	15	–	15 hr	2000/9

Special Facilities and Programs: Linac program, neutron cross section and neutron transport research. Nuclear medicine, regular and short courses. Critical facility, regular and short courses, operator training and startups. Theoretical reactor physics and design. Cooling tower plume research. Fuel management. Nuclear instrumentation. Computer interfacing. Mass spectrometry laboratories.

For Additional Information: M. L. Yeater, Department of Nuclear Engineering

RENSSELAER POLYTECHNIC INSTITUTE OF CONNECTICUT

Hartford, Conn. 06120 (467 stud; coed; MS; prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	15	–

Special Facilities and Programs: The nuclear engineering program offers advanced study in the engineering of nuclear energy conversion systems and permits a student without an undergraduate degree in nuclear engineering to obtain the background for advanced work in this field. A plan of study for the Master of Engineering Science in Nuclear Engineering can be structured from the following courses: nuclear energy conversion, nuclear reactor analysis, numerical methods in reactor analysis, reactor physics, nuclear engineering design, nuclear reactor control, and nuclear materials.

For Additional Information: Harry McNeill, Department of Nuclear Engineering

RHODE ISLAND, UNIVERSITY OF

Kingston, R.I. 02881 (15,447 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	4	–
Nuclear Physics	–	3	3

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	X	X	9 hr	T
Teaching assistant	X	X	9 hr	T
Fellow	X	–	12 hr	T
Scholar	X	–	12 hr	T

Special Facilities and Programs: One area of specialization is in ocean engineering applications of nuclear technology. Research is conducted in conjunction with the Ocean Engineering Department. Current projects involve utilization of radioisotopes for in situ measurement of ocean sediment properties and economics of coastal zone and offshore power plant siting. Neutron scattering, diffraction, and radiation experiments are carried out at the Rhode Island Nuclear Science Center at the Warragansett Bay Campus and in conjunction with Brookhaven National Laboratory.

For Additional Information: Frank T. Dietz, Department of Physics
Vincent Rose, Department of Nuclear Engineering

ROANOKE COLLEGE

Salem, Va. 24153 (1,324 stud; coed; BS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Emphasis on health physics and medical physics

For Additional Information: Lee S. Anthony, Department of Physics

ROCHESTER, UNIVERSITY OF

Rochester, N.Y. 14627 (8,418 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Radiation Biology	–	34	19

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Lab participant	10	none	100%	T + 3000/12
Trainee	40	none	100%	T + 3000/12

Tax free

Special Facilities and Programs: The Department of Radiation Biology and Biophysics offers the MS and PhD degrees in Radiation Biology and in Biophysics with research available in such areas as nuclear medicine, biological effects of radiation on molecular, cellular, and organismic levels, radiation physics, and radiation biophysics. The university is a member of Associated Universities, Inc.

For Additional Information: Irving L. Spar, Department of Radiation Biology and Biophysics

SAINT BONAVENTURE UNIVERSITY

Saint Bonaventure, N.Y. 14778 (2,420 stud; coed; PhD; general)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Physics assistant	4	12 hr	9 hr	T + 2400/11
Biology assistant	7	12 hr	10 hr	T + 2400/11

For Additional Information: Fr. Zachary O'Friel, OFM, Department of Physics

SAINT JOHN'S UNIVERSITY

Jamaica, N.Y. 11432 (13,734 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics		X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	12	12-15 hr	9 hr	2600/9

For Additional Information: Eugene Butkov, Department of Physics

SAM HOUSTON STATE UNIVERSITY

Huntsville, Texas 77340 (10,438 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics		X	

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Assistant	5	V	9-12 hr	3.50/hr
Fellow	7	10 hr	9-12 hr	2700/9 1st yr. 2925/9 2nd yr.

Special Facilities and Programs: Nuclear geophysics, rare earth and fission product distributions in earth's crust, and radiation environment in near surface sediments of the earth's crust.

For Additional Information: Hugh E. Hall, Department of Physics
C. K. Manka, Department of Physics

SEATTLE PACIFIC COLLEGE

Seattle, Wash. 98119 (1,997 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: O. Karl Krienke, Department of Physics

SEATTLE UNIVERSITY

Seattle, Wash. 98122 (2,933 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Nuclear medical technology, nuclear environmental science, and nuclear instrumentation.

For Additional Information: Jerry A. Riehl, Department of Physics

SOUTH CAROLINA, UNIVERSITY OF

Columbia, S.C. 29208 (18,667 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	14	9

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant (P)	25	12 hr	–	3000-3600/9

Foreign students eligible
Tuition reduced to $30 per semester.

Special Facilities and Programs: Nuclear Physics: Studies of nuclear structure, based on stripping and pickup reactions, inelastic scattering, many particle breakup and high energy collision processes are in progress, using the 600 MeV proton beam from the S.R.E.L. synchrocyclotron at the NASA Langley Research Center, and the isochronous cyclotrons at Oak Ridge National Laboratory and Michigan State University. Nuclear reactions are also being employed to study ionic channeling in crystals.

Beta decay, internal conversion and gamma decay are being investigated for the purpose of studying properties of nuclear levels and of the decay processes themselves. Directional correlations, lifetimes and transition intensities are measured using solid state detectors and magnetic electron spectrometers. Nuclear track emulsion techniques are used to study the decay of highly excited nuclei.

Experiments are being conducted by USC faculty in collaboration with Virginia Polytechnic Institute and the Oak Ridge National Laboratory at the Los Alamos Meson Facility (LAMPF) to measure the scattering of pions from a large range of separated isotopes. The absorption of positive pions by deuterons is also being studied.

A rapid sweeping spectrometer developed by USC faculty is used for measuring electron spectra of short-lived radionuclides produced by the University's Isotope Separator on line with the Oak Ridge Isochronous Cyclotron (UNISOR).

The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: R. D. Edge, Department of Physics

SOUTHERN CALIFORNIA, UNIVERSITY OF

Los Angeles, Calif. 90007 (19,896 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	X
Health Physics	X	–	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	X	X	9 hr	V

Special Facilities and Programs: The main interest of the Nuclear Physics Group concerns direct nuclear reactions. In the near future experiments will be performed predominantly with the proton beam and the Los Alamos Meson Physics Facility.

For Additional Information: H. H. Forster, Department of Physics

SOUTHERN METHODIST UNIVERSITY

Dallas, Texas 75275 (10,535 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	5	1

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching fellow	X	15 hr	9 hr	2700/9

Special Facilities and Programs: Nuclear decay schemes; reaction cross sections, principally fast neutron; and neutron transport properties. The university is a member of Oak Ridge Associated Universities.

For Additional Information: C. W. Tittle, Department of Physics

SOUTHWESTERN LOUISIANA, UNIVERSITY OF

Lafayette, La. 70501 (11,436 stud; coed; PhD; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	4	50%	50%	2000-2400/9

For Additional Information: J. R. Meriwether, Department of Physics
T. B. Metcalf, Department of Chemical Engineering

STANFORD UNIVERSITY

Stanford, Calif. 94305 (12,403 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	10	3
Nuclear Engineer (1)			
Nuclear Physics	–	3	14
Nuclear Chemistry	–	4	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	20 hr	50%	T + 300-350/1
Teaching assistant	2	20 hr	50%	T + 300-350/1
Fellow	7	none	100%	T + 2400-3000/12

Foreign students eligible. Income tax waived.

Special Facilities and Programs: Nuclear Engineering Laboratory: Spontaneous fission studies; pulsed-neutron studies; theoretical studies in neutron transport theory; radiation transport; kinetic theory of gases; optimization of reactor lattices; refueling strategies. Stanford Linear Accelerator Center: Experimental studies on radiation shielding and dosimetry. Plasma Gasdynamics Laboratory: Research on MHD energy conversion. High-Energy Physics Laboratory: Includes nuclear physics research. Plasma Physics Laboratory: Experimental and theoretical work on plasma containment and stability problems. Biophysics Program: PhD-level research and instruction in molecular biophysics and radiation biology. Hydrology and Nuclear Civil Engineering: MS and PhD program which includes research efforts in environmental radiology and nuclear hydrology.

For Additional Information: W. E. Meyerhoff, Department of Physics
R. Sher, Department of Mechanical Engineering

STEVENS INSTITUTE OF TECHNOLOGY

Hoboken, N.J. 07030 (2,152 stud; coed; PhD; prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	–	9

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (P)	6	50%	8 hr	2800-3100/9
Teaching assistant (P)	13	50%	8 hr	2800-3100/9
Teaching assistant*	16	50%	8 hr	2400-2800/12
Fellow, trainee	16†	1½ hr	15 hr	2400-2800/12

Foreign students eligible for assistantships.
* *Chemistry/Chemical Engineering*
† *Renewable and 1-year appointments*

Special Facilities and Programs: An applied physics option at the MS level can be directed to nuclear physics. Doctoral research in particle physics, both experimental and physical, Mössbauer effect, and plasma physics.

For Additional Information: Francis T. Jones, Department of Chemistry
Kenneth Moser, Department of Mechanical Engineering
Snowden Taylor, Department of Physics

SYRACUSE UNIVERSITY

Syracuse, N.Y. 13210 (19,006 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	12	50%	24 hr/yr	3100/9
Research assistant	12	100%	–	1200/3*
Teaching assistant	29	50%	24 hr/yr	3100/9

* *Summer months*

Special Facilities and Programs: The Department of Physics has a special interest in high energy particle physics.

For Additional Information: Nathan Ginsburg, Department of Physics

TEMPLE UNIVERSITY

Philadelphia, Pa. 19122 (28,609 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	6	18 hr	3 courses	3200/9
Teaching assistant	29	6-9 hr	3 courses	3200/9
Fellow	4	none	3 courses	2700/9
Trainee (NSF, NDEA)	3	none	3 courses	2700/9

Foreign students eligible

Special Facilities and Programs: Program makes use of Los Alamos Meson Physics Facility, and is primarily particle physics rather than nuclear physics. We have some interest in nuclear physics.

For Additional Information: W. K. McFarlane, Department of Physics

TENNESSEE TECHNOLOGICAL UNIVERSITY

Cookeville, Tenn. 38501 (6,607 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	5	18 hr	10 hr	T + 2475-2700/9

Special Facilities and Programs: A nuclear option is available in the Department of Engineering Science at the BS and MS levels. The Department of Chemistry offers a basic course in nuclear chemistry which includes preparation of samples, beta- and gamma-ray detection, and various experiments involving the handling of radioisotopes and their detection. The university is a member of the UNISOR Consortium.

For Additional Information: Ray Kinslow, Department of Engineering Science
J. Lin, Department of Physics
A. W. Singer, Department of Chemistry
F. R. Toline, Department of Engineering Science

TENNESSEE, UNIVERSITY OF

Chattanooga, Tenn. 37401 (4,920 stud; coed; MS; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	–	–
Nuclear Physics	X	X	–

Special Facilities and Programs: Radiation physics, low energy nuclear physics, and reactor engineering analysis.

For Additional Information: G. W. Spangler, Department of Physics

TENNESSEE, UNIVERSITY OF

Knoxville, Tenn. 37916 (26,370 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	X	X	X
Health Physics	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	10P, 8N	20-40 hr	no restr.	3800-7200/12
Graduate assistant	30P, 2N	20 hr	–	T + 2800/9
Teaching assistant	15P, 2N	20 hr	9 hr	3000/9
Fellow, trainee	5P, 3N	none	no restr.	2400-5200/12

Special Facilities and Programs: The primary emphasis in nuclear engineering is on the design and analysis of nuclear power systems. Areas of specialization includes core design, economics, controls and instrumentation, shielding, and energy transport. Nuclear engineering students at the University of Tennessee have unique opportunities to make use of many of the special facilities at the Oak Ridge National Laboratory.

The primary nuclear physics emphasis is connected with studies of Perturbed Angular Correlations, decay themes and direct reactions. Recently the Physics Department of the University of Tennessee was instrumental in the purchase of an on line isotope separator located at the Oak Ridge National Laboratory Isochronous Cyclotron and operated by a university group

(UNISOR). This apparatus represents one of the most flexible and modern facilities in the country for the investigation of nuclei far off from stability.

The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: William H. Bugg, Department of Physics
P. F. Pasqua, Department of Nuclear Engineering

TEXAS AGRICULTURAL AND MECHANICAL UNIVERSITY

College Station, Texas 77843 (16, 391 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	–	X	X
Health Physics	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (P)	6	50%	12 hr	350/1
Teaching assistant (P)	3	50%	12 hr	350/1
Fellow (P)	3	none	16 hr	350/1
Trainee (rad. health)	10	none	16 hr	3000/12

Special Facilities and Programs: Department of Nuclear Engineering specialties are reactor physics, reactor engineering, radiological safety, thermonuclear engineering, nuclear fuel cycle and licensing matters, coolant water modeling and environmental effects, and activation analysis. Short courses: Power Reactors and Their Environmental Effects; Activation Analysis; and Reactor Familiarization. The university is a member of Associated Western Universities and Oak Ridge Associated Universities.

For Additional Information: R. G. Cochran, Department of Nuclear Engineering
George W. Kattawar, Department of Physics

TEXAS ARTS AND INDUSTRIES UNIVERSITY

Kingsville, Texas 78363 (8,043 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Assistant instructor	2-3	40%	9 hr	2970/9

For Additional Information: Olan E. Kruse, Department of Physics

TEXAS CHRISTIAN UNIVERSITY

Fort Worth, Texas 76129 (6,595 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Fellow	10	0-25%	75-100%	3000-3600/12

Special Facilities and Programs: Electron scattering, X-ray production, inner shell ionization, bremsstrahlung, atomic and electron physics. The university is a member of Oak Ridge Associated Universities.

For Additional Information: R. J. Lysiak, Department of Physics

TEXAS, UNIVERSITY OF

Austin, Texas 78712 (44,446 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Science	X	X	X
Nuclear Physics	X	X	X
Nuclear Chemistry	X	X	X
Radiochemistry	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (P)	3	50%	50% min.	2000-3600/9
Teaching assistant (P)	7	50%	50% min.	1840-3195/9
Teaching assistant (N)	1	50%	50% min.	1840-3195/9
Trainee (AEC) (N)	5	none	100%	D + 2400/12

Special Facilities and Programs: Special programs exist in energy systems engineering, fusion engineering, nuclear materials safeguards, fission physics, and neutron activation analysis. The university is a member of Oak Ridge Associated Universities.

For Additional Information: E. Linn Draper, Jr., Department of Mechanical Engineering
R. N. Little, Department of Physics

TULSA, UNIVERSITY OF

Tulsa, Okla. 74104 (6,031 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Short courses in medical technology including topics in health physics and nuclear applications. Short courses in nuclear techniques applied to chemical analysis, neutron activation analysis, energy dispersive X-ray spectroscopy. Includes time at Oak Ridge.

For Additional Information: W. P. Moran, Department of Physics

TUSKEGEE INSTITUTE

Tuskegee Institute, Ala. 36088 (3,353 stud; coed; MS; general and prof.)

DEGREES IN NUCLEAR FIELDS Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74 Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	50%	100%	4570/12
Trainee (AEC)	5	0	100%	T + 2400/12

Special Facilities and Programs: Nuclear Center-School of Engineering: AGN 201 reactor primarily used as a teaching tool to give students reactor operating experience and for low level activation analysis; Kaman PNG 1250 primarily used for neutron activation analysis; time-space measurements, and fast neutron radiography; Subcritical reactors used in neutron flux, buckling experiments, optimum fuel spacing, and comparison of water-graphite moderator characteristics; General purpose laboratory used for teaching basic radiation detection as well as applications with radiation detection systems such as fast-slow coincidence, etc. Carver Radiation Lab: 2 kCi Cesitron; 30 kW furnace; inert atmosphere glove box; presently used in measuring density of alkali metals by gamma-ray attenuation methods. Milbank Hall: Liquid scintillation counting systems used for analysis of plant and animal samples; Cs-137 source used for study of low level radiation effects in animals and plants. The university is a member of Oak Ridge Associated Universities.

For Additional Information: R. B. Bettis, Department of Environmental Science
Z. W. Dybczak, Dean of the School of Engineering
F. E. Levert, Department of Mechanical Engineering

UNION COLLEGE

Schenectady, N.Y. 12308 (2,907 stud; coed; PhD; general)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: V. E. Pilcher, Department of Physics

UTAH STATE UNIVERSITY

Logan, Utah 84322 (8,746 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74 Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	2	X	12 hr	3000/9
Fellow	2	X	12 hr	3000/9

Special Facilities and Programs: The university is a member of Associated Western Universities.

For Additional Information: Owen K. Shupe, Department of Mechanical Engineering

UTAH, UNIVERSITY OF

Salt Lake City, Utah 84112 (21,767 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	X
Nuclear Physics	–	X	X
Nuclear Chemistry	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74 Title	No.	Service	Acad. load	Stipend/months
Fellow	3	–	12 hr	2500/9

Special Facilities and Programs: The university is a member of Associated Western Universities which provides graduate student fellowships.

For Additional Information: Gary M. Sandquist, Department of Mechanical Engineering

VALPARAISO UNIVERSITY

Valparaiso, Ind. 46383 (4,535 stud; coed; MS; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	22	–	–

Special Facilities and Programs: The Department of Physics and the School of Engineering have a combined program in which students of electrical engineering take a course in reactor physics.

For Additional Information: A. W. Manning, Department of Physics

VANDERBILT UNIVERSITY

Nashville, Tenn. 37203 (6,825 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	1	1	–
Nuclear Physics	–	10	25
Health Physics	–	3	5

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research fellow	11	25%	75%	T + 2400-3600/12*
Teaching fellow	14	25%	75%	T + 2600/9†
AEC fellow (HP)	4	X	X	X
Trainee (NDEA, NSF, NASA)	2	none	100%	T, D + 2400-2800/12*

** Non-taxable*
† $950 taxable

Special Facilities and Programs: Radioactivity studies: beta- and gamma-ray spectroscopy, radioactive nuclei produced at reactor and cyclotron at Oak Ridge National Laboratory (ORNL), short lived isotopes studied in collaboration with ORNL scientists. Some students work full time at ORNL. Heavy ion physics in the UNISOR project at ORNL. University Isotope Separator on line with ORIC cyclotron to produce and study nuclei very far from stability. Cooperative experiments with tandem Van de Graaff at ORNL. Other cooperative experiments are carried out with nuclear medicine at Vanderbilt and with Isotopes Division of ORNL. The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: I. Bloch, Department of Physics and Astronomy
A. B. Brill, Department of Radiology
J. H. Dunlap, Department of Mechanical Engineering
J. H. Hamilton, Department of Physics and Astronomy

VERMONT, UNIVERSITY OF

Burlington, Vt. 05401 (9,825 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching fellow	10	50%	10 hr	T + 2600/10
Fellow	X	–	–	V

Special Facilities and Programs: Plasma physics and quantum field theory.

For Additional Information: J. D. Juenker, Department of Physics

VILLANOVA UNIVERSITY

Villanova, Pa. 19085 (10,258 stud; coed; PhD; general and prof.)

NO DEGREES IN NUCLEAR FIELDS.

Special Facilities and Programs: Biology Department research, DNA biosynthesis in developing leaves; plant physiology courses incorporating H-3 and C-14 labeled DNA precursors.

For Additional Information: William G. Driscoll, Department of Physics

VIRGINIA MILITARY INSTITUTE

Lexington, Va. 24450 (1,106 stud; men; BS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

For Additional Information: John W. Knapp, Department of Civil Engineering
James B. Newman, Department of Physics

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Va. 24061 (14,471 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	103	21	6
Nuclear Science	13	–	–
Nuclear Physics	–	10	16
Nuclear Chemistry	–	X	X
Radiochemistry	–	2	3

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	14	20 hr	12 hr	370-415/1
Teaching assistant	24	20 hr	12 hr	370-415/1
Fellow (NDEA, NSF, NASA)	6	none	16 hr	370-415/1
Trainee (AEC)	6	none	16 hr	370-415/1

Special Facilities and Programs: Nuclear engineering: nuclear power systems, fuel economics, reactor analysis, neutron spectroscopy, activation analysis, reactor operations and safety. Chemistry: Mössbauer studies, hot atom chemistry, positronium chemistry, nuclear fluorescence resonance spectroscopy, production of radioactive isotopes, and radioactive labeling of organic molecules. The university is a member of Oak Ridge Associated Universities and the UNISOR Consortium.

For Additional Information: A. F. Clifford, Department of Chemistry
M. C. Edlund, Nuclear Engineering Group

VIRGINIA, UNIVERSITY OF

Charlottesville, Va. 22903 (12,907 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	X	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	10	20 hr	75%	3600-4000/12
Teaching assistant	6	20 hr	75%	2800-3000/9
Fellow	10	–	full	2400-2800/9

Special Facilities and Programs: Nuclear engineering degree candidates may major in either Reactor Engineering or Radiation Science and Protection. The university is a member of Oak Ridge Associated Universities and Associated Western Universities.

For Additional Information: J. L. Meem, Department of Nuclear Engineering

WASHINGTON AND LEE UNIVERSITY

Lexington, Va. 24450 (1,667 stud; men; BS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Cooperative engineering program with Columbia University and Rensselaer Polytechnic Institute in which nuclear engineering is one option.

For Additional Information: W. B. Newbolt, Department of Physics

WASHINGTON STATE UNIVERSITY

Pullman, Wash. 99163 (14,852 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	50%	10-12 hr	4246/12
Teaching assistant	V	50%	10-12 hr	3978/9

Foreign students eligible

Special Facilities and Programs: The Nuclear Radiation Center at Washington State University is a special research facility accessible to the entire university and to other universities in the region for both research and education. Programs in Nuclear Engineering and in Nuclear Science are closely associated with activities at this Center. Laboratory courses in Nuclear Engineering and in Nuclear Science make extensive use of the nuclear reactor and associated analytical equipment. The Center is internationally recognized in the area of Neutron Activation Analysis. Interdisciplinary research projects are common.

Engineering studies include measurement of trace elements in crude oil, neutron radiography of polymer bonding in rocks, and use of radioactive tracers to study electrochemical overvoltage. Environmental studies involve paper mill stream pollutants, eutrophication in lakes, mercury fungicide pollution and other metal contaminants. Geochemical studies involve trace element measurements in basalt rocks and crude oils. Research in biology and agriculture is concerned with genetic mutations by irradiation, plant breeding problems, trace metal deficiencies in livestock, ion migration in plant cells, and other studies. Fundamental investigations in physics and chemistry make use of both the reactor and the accelerators. There is an expanding

program in applications of nuclear techniques in environmental chemistry. Fission track studies are used in environmental and archeological sciences. Neutron scattering measurements at an angle of 180°, capture gamma studies, and hot atom chemistry are representative areas.

Through the Joint Center for Graduate Study at Richland, Wash., the AEC Hanford Laboratories are available for cooperative work in nuclear studies.

Washington State University operates an AEC-supported Reactor Sharing Program for colleges and universities in the Northwest.

Four AEC-NSF Summer Institutes in Nuclear Science and Engineering have been held since 1962. Two Summer Institutes (1971 and 1973) have been held on neutron activation analysis and applications to environmental studies.

For Additional Information: Royston H. Filby, Department of Chemistry
George W. Hinman, Nuclear Radiation Center
W. E. Wilson, Department of Chemical and Nuclear Engineering

WASHINGTON, UNIVERSITY OF

Seattle, Wash. 98195 (34,125 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	X	X	X
Nuclear Physics	—	—	15
Nuclear Chemistry	—	—	5

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (C,P)	8	50%	9+ hr	405/1
Teaching assistant (C,P)	25	50%	9+ hr	441/1
Research assistant (N)	10	50%	100%	3600-4800/9-12
Teaching assistant (N)	2	50%	100%	4050/9
Fellow (AEC)*	1	X	9 hr	5200/24
Trainee (USPHS)*	6	X	9 hr	6000/24

Foreign students eligible for assistantships.
* *Radiology Department*

Special Facilities and Programs: Research to be performed during 1974 at the Nuclear Physics Laboratory will encompass a broad range of topics in nuclear physics including (a) scattering and reactions of nucleons and light ions to obtain information about reaction mechanisms and nuclear structure; (b) gamma ray spectra subsequent to particle capture or other nuclear reactions; (c) fission and the properties of shape isomers; (d) reactions related to nuclear astrophysics; (e) reactions involving polarized beams of hydrogen ions; (f) scattering and transfer reactions with heavy ion projectiles; (g) symmetry breaking in nuclei, in particular, possible evidence for parity and isospin admixtures; and (h) X-ray and Auger electron production in atoms following heavy ion bombardment.

For Additional Information: Albert L. Babb, Department of Nuclear Engineering
Isaac Halpern, Department of Physics

WESLEYAN UNIVERSITY

Middletown, Conn. 06457 (1,834 stud; coed; PhD; general)

NO DEGREES IN NUCLEAR FIELDS

Special Facilities and Programs: Cooperative engineering program with Columbia University and California Institute of Technology in which nuclear engineering is one option.

For Additional Information: M. Gilbert Burford, Assistant Provost

WEST VIRGINIA INSTITUTE OF TECHNOLOGY

Montgomery, W.Va. 25136 (2,355 stud; coed; BS; general)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	—	—

For Additional Information: A. R. Rana, Department of Physics

WEST VIRGINIA UNIVERSITY

Morgantown, W.Va. 26506 (18,482 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X
Radiochemistry	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	3	20 hr	12 hr	2400-4200/12
Teaching assistant	3	25-50%	12 hr	2000-4000/9

Foreign students eligible

Special Facilities and Programs: The nuclear engineering program provides courses in the area of nuclear power engineering to complement existing power oriented programs in the Departments of Mechanical and Electrical Engineering. Emphasis is on reactor design, systems analysis, and environmental and economic considerations. Research includes radiation-induced chemical reactions and radiation processing using the 21,000 Ci air-cave and water well irradiator. (These activities are centered in the Department of Chemical Engineering.) The Department of Physics is concerned with the study of 14 MeV neutron induced reactions with emphasis on angular cross section measurements. The Department of Chemistry is concerned with radiochemistry techniques to identify and study chemical reactions. The Department of Radiology is concerned with medical physics applications of radiation for diagnostic and therapeutic purposes. The university is a member of Oak Ridge Associated Universities.

For Additional Information: Atam P. Arya, Department of Physics
G. Lansing Blackshaw, Department of Chemical Engineering
R. Harold Galbraith, Department of Radiology
Alan C. Ling, Department of Chemistry

WESTERN MICHIGAN UNIVERSITY

Kalamazoo, Mich. 49001 (22,349 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	X	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	2	10-20 hr	50-100%	2900/9
Teaching assistant	10	10-20 hr	50-100%	2900/9
Fellow	1	none	100%	2900/9

Foreign students eligible—in-state tuition rates.

For Additional Information: E. M. Bernstein, Department of Physics

WILLIAM AND MARY, COLLEGE OF

Williamsburg, Va. 23185 (5,876 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Physics	–	X	X
Nuclear Chemistry	–	X	–

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	13	10 hr	100%	3600/12
Teaching assistant	3	10 hr	100%	2700/9
Fellow	13	–	100%	2700/9, 3600/12
Combination teaching assistant/fellow	10	10 hr	100%	3600/12

Special Facilities and Programs: The Space Radiation Effects Laboratory, a major nuclear facility, is run by the College with funds from the State of Virginia and a grant from NSF. The Laboratory is located 20 miles from the campus, and all accelerators are located there. The college is a member of Oak Ridge Associated Universities.

For Additional Information: The Chairman, Department of Physics

WISCONSIN, UNIVERSITY OF

Madison, Wis. 53706 (34,886 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	126	76	31
Nuclear Physics	–	23	43
Nuclear Chemistry	–	5	14
Radiochemistry	–	3	5
Health Physics	–	13	12

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant (E)	125	20 hr	9-12 hr	4116/12*
Research assistant (P)	16	50%	100%	4116/12*†
Teaching assistant (N)	X	V	V	V
Fellow (university)(N)	X	none	9-12 hr	4116/12*
Fellow (national) (N)	X	none	–	3600/12

Foreign students eligible for Nuclear Engineering University Fellowships and Research Assistantships.
** Out-of-state tuition waived*
† Non-taxable

Special Facilities and Programs: Polarized source of negative ions for 6N Tandem (Lamb-shift type), study of tensor polarization effects, study of vector polarization effects, isospin forbidden reactions, and associatd particle method for accurate measurement of neutron cross section. The university is a member of Argonne Universities Association.

For Additional Information: Max W. Carbon, Department of Nuclear Engineering
D. W. Kirst, (plasma physics) Department of Physics
Don Reeder, (high energy physics) Department of Physics
H. T. Richards, (nuclear physics) Department of Physics

WORCESTER POLYTECHNIC INSTITUTE

Worcester, Mass. 01609 (2,537 stud; coed; PhD; prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–
Nuclear Physics		X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Teaching assistant	8	20 hr	20 hr	2500/9

Special Facilities and Programs: Areas of specialization within the nuclear engineering program include neutron activation analysis and neutron radiography.

For Additional Information: L. C. Wilbur, Department of Mechanical Engineering
B. A. Wooten, Department of Physics

WYOMING, UNIVERSITY OF

Laramie, Wyo. 82070 (9,989 stud; coed; PhD; general and prof.)

DEGREES IN NUCLEAR FIELDS

Available; granted 1967-73	BS	MS	PhD
Nuclear Engineering	–	X	–
Nuclear Physics	–	X	X

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Research assistant	1	12 hr	12+ hr	2898/9
Teaching assistant	3	12 hr	12+ hr	2898/9

Special Facilities and Programs: The university is a member of Associated Western Universities.

For Additional Information: Richard J. Jiacoletti, Department of Mechanical Engineering
Victor A. Ryan, Department of Chemistry

YOUNGSTOWN STATE UNIVERSITY

Youngstown, Ohio 44503 (13,988 stud; coed; MS; general and prof.)

NO DEGREES IN NUCLEAR FIELDS

APPOINTMENTS AVAILABLE TO GRADUATE STUDENTS, 1973-74

Title	No.	Service	Acad. load	Stipend/months
Graduate assistant	79	20 hr	6-12 hr	2600/12
Scholar	1	none	12	V

Special Facilities and Programs: Neutron activation analysis studies of the Mahoning River System using a 10 mg Californium-252 neutron source. We are evaluating the potential for using this source, on loan from Savannah River Operations Office, to determine the type, concentration and point of origin of trace elements in the river and its tributaries. Undergraduate and graduate students, working on their master's degrees, are actively engaged in the research.

Research work is presently being conducted in our radioisotopes laboratory on the following projects: (1) The use of P-32 to examine the initiation of crown gall; (2) Circulating blood volume of mylerancortisol treated rats.

Table II

FACILITIES, EQUIPMENT, AND COURSES

The great variety of courses reported as being available made it necessary to categorize certain of them to fit the format adopted for Table II in the fourth edition and retained for the fifth edition. Those courses and their categories are shown below:

Health Physics; Radiobiology
Biophysics
Environmental Radiology
Radiation Effects
Radiological Physics
Reactor Safety

Nuclear Technology
Nuclear Engineering
Reactor Analysis
Reactor Design
Reactor Instrumentation
Reactor Laboratory.

Radiation Hazards Control
Radiation Shielding
Waste Disposal

Reactor Materials
Nuclear Metallurgy

INSTITUTION	REACTOR				ACCELERATOR (e = electron, p = positive ion, b = both)							ANALYZING EQUIPMENT																
	Type	Power (kW)	Beam holes, t=thermal column	Subcritical, graphite or water	dc generator	Electrostatic	Cyclotron, all types	Betatron	Linear	Synchrotron	Energy (max, MeV)	Multichannel (> 99 ch.)	Multiparameter	Mössbauer	Coincidence	Angular correlation	Detectors, Si or Ge(Li)	Low-level counting	Activation analysis	Neutron diffraction	Cloud, bubble, spark chambers	Mass spectrometer	NMR or ESR	Molecular beam	Microscopy, electron/field ion	Whole-body counter
Alabama, U of (Birmingham)						p	p	e			0.5; 2; 4 18	X	●	●	●		●	●	●				●		●	
Alabama, U of (University)				w								5		●	●	●	●					●	●		●	
Alaska, U of												1		●	●			●	●		●	●	●	●	●	
Arizona State U				w								1	●		●		●	●				●	●		●	
Arizona, U of	TRIGA I	100		w		p			e		2 1	4	●		●		●	●	●			●				
Auburn U				w		b					3	3			●	●	●	●	●		●				●	
Baylor U						b					2	1	●										●			
Boston Coll						p					0.5	2		●	●		●				●		●		●	
Boston U	h. water	5,000	t									3	●	●	●	●	●	●	●							
Bowling Green State U																							●			
Brandeis U												4			●		●	●					●	●		
Brigham Young U	L-77	0.01	9		p						4	3			●	●	●	●	●		●					
Brown U					p						0.3	2		●		●					●		●		●	
Bryn Mawr Coll												1	●		●	●	●						●			
Bucknell U				w											●			●	●				●		●	
Butler U												1	●		●			●	●		●		●			
California State U (Fresno)												2			●	●		●				●	●		●	
California State U (Long Beach)												1		●	●	●	●	●					●		●	
California State U (Los Angeles)						p					4	3	●		●		●		●				●	●		
California State U (Northridge)				x		e					0.4	3	●	●	●	●	●	●	●		●	●	●		●	
California State U (San Diego)	TRIGA	1,500	x	w	b						0.25	4			●		●	●	●		●		●		●	●
California State U (San Jose)												3	●	●		●	●	●	●		●	●	●		●	
California, U of (Berkeley)	TRIGA III	1,000	8, t	g							1.0	6			●		●	●	●					●		
California, U of (Davis)	LNTR	3,000	t			x	b		e		75 100	X	●	●	●	●	●	●	●	●	●	●	●	●	●	
California, U of (Los Angeles)	Argonaut	100	15, t	g hw	b						0.2	3	●		●		●		●							

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Neutron generator (Power at 10 n/s)	Isotopic neutron source	Gamma source (>50 curies), Ci	Digital	Analog (no. of amplifiers)	Reactor simulator	Atomic and nuclear physics	Radio and nuclear chemistry	Health physics; radiobiology	Nuclear technology	Radiation hazards control	Reactor materials	Reactor fuel technology	Thermonuclear; plasmas	Radioisotope techniques	Other (key at right)	INSTITUTION
		X	IBM 370/155; Sigma 7 PDP 7, 8-I			1U 1E		2U 2E						1E		Alabama, U of (Birmingham)
	●		Univac SS80, 1108 IBM 360/30, 360/50			4U 6G	3E 1G	1U 1E	1U 3E		1E					Alabama, U of (University)
			IBM 360, 1620 COMP 425G; NOVA 800			2U 1G		1U								Alaska, U of
X	●			15; 18	●	3U 2G	2E		3U 3G	1E				1E	b	Arizona State U
	●	350	CDC 6400; NOVA	96		1U 1E	2G		8U 6G	1U 3E	4U 3G	1U 1G	1E 1G	2U 2G	a b	Arizona, U of
	●	120; 3000 12,000	IBM 370/155, 1620, 1401 HP 2000E	144; 60; 40; 24; 20; 16+		4U 3G	1G	4E 2G	8U 4G	3U 4G			4G	1G	b	Auburn U
	●		IBM 1620; MH 1200 CDC 6600			4U 4G										Baylor U
			PDP 5			2E 1G		1G						1E		Boston Coll
	●		IBM 360/50H			1U 2G	1U								a	Boston U
			IBM 360/75			2E										Bowling Green State U
			PDP 8-E, 10, 15			1U 1G		1U 1G								Brandeis U
	●	400	IBM 360/65, 7030 LIBR; PDP 10			1E 2G	1G		4E 1G				2G			Brigham Young U
10	●		IBM 360/50; PDP 9			2E 2G		3E 1G								Brown U
			PDP 8-I; IBM 370/165	10		1U 2G		1E								Bryn Mawr Coll
	●		Sigma 7	10		2U 1E		1U 1G	1U 1E							Bucknell U
		250					XE	XE		XE				XE	h	Butler U
5			CDC 3150			1U 1G	1U								b	California State Coll (Fresno)
11	●		CDC 3150			2U 1G	1E		1U				1E 1G		b	California State U (Long Beach)
X			CDC 3300			4U 1G		8U								California State U (Los Angeles)
	●		CDC 3300 (2); LGP 30	20 (4)		4U 2G	2U	1U	4U 1G	2U				1U	b	California State U (Northridge)
11	●		IBM 1620; PDP 12/30	15; 30		5U 2G	1U 1G	4E 3G						1E		California State U (San Diego)
	●	4,500	CDC 3300, 3170ts VARIAN 620 I			3E	2E	2E	3E 1G					1E 1G	b	California State U (San Jose)
11	●		Wang 700A PDP 7; CDC 6400 (2)			7U 4G	2U 2G	1U 4G	4U 10G	5U 2G	1U 2G	1U 1G	2G	1U 1G		California, U of (Berkeley)
12	●	30,000	CDC 3400, 6600, 7600 BUR 6500	X		2U 5G	1U 2G									California, U of (Davis)
11	●		IBM 360/91, 1024	10		4U 7G	4G	3U 6G	7U 9G	1U 2G	1U 3G	1U 1G	2U 1G	3G	b e	California, U of (Los Angeles)

INSTITUTION	REACTOR				ACCELERATOR (e = electron, p = positive ion, b = both)							ANALYZING EQUIPMENT																
	Type	Power (kW)	Beam holes, t=thermal column	Subcritical, graphite or water	dc generator	Electrostatic	Cyclotron, all types	Betatron	Linear	Synchrotron	Energy (max, MeV)	Multichannel (> 99 ch.)	Multiparameter	Mossbauer	Coincidence	Angular correlation	Detectors, Si or Ge(Li)	Low-level counting	Activation analysis	Neutron diffraction	Cloud, bubble, spark chambers	Mass spectrometer	NMR or ESR	Molecular beam	Microscopy, electron/field ion	Whole-body counter
California, U of (San Diego)																												
California, U of (Santa Barbara)	L-77	0.01	9	w					e		30	1		●	●	●	●	●	●		●		●	●	●		
Carnegie-Mellon U				w		e					x	1		●								●			●		
Case Western Reserve U							p				4	1	●	●	●	●	●	●			●		●	●	●		
Catholic U of America	AGN-201	0.0001	1, t	w		p					15	2		●	●		●		●						●		
Chicago, U of						e			e		2; 50	3					●	●							●	●	
							p				8.2; 14.8																
Cincinnati, U of				w			e				2	1			●			●	●								
								e			11.5																
Citadel, The					p						4	1			●		●	●	●				●		●		
Clark U												4	●	●	●		●	●	●			●	●	●	●		
Clarkson Coll of Tech				w								1															
Colorado Sch of Mines												4	●	●	●		●	●	●			●	●		●		
Colorado State U												1					●	●	●				●		●	●	
Colorado, U of							p				28	1	●	●	●		●		●				●				
Columbia U	TRIGA II	250	4, 2t	w 2g	b	p	p				0.15; 550 6	6	●	●	●	●	●	●	●		●	●	●	●	●	●	
Cornell U	TRIGA II ZPR	100 0.1	6t	w					p	e	3 12,000	5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Creighton U									p		0.15	2			●	●	●	●	●		●		●		●		
Dayton, U of												1					●						●		●		
Delaware, U of	AGN 201	0.0001	5, t			e p					2.5	3	●	●		●	●					●	●		●		
Denver, U of												X		●			●	●			●	●	●	●	●		
De Paul U					e	p					0.1 2	1		●	●	●	●	●	●		●	●	●	●			
De Pauw U												1					●						●				
Drake U																											
Drexel U	IRL	5,000	6, t			p					12	3	●	●	●	●	●	●	●				●		●	●	
Duquesne U												X	●	●	●				●		●	●	●		●		
East Texas State U												3			●		●	●	●			●	●	●			

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Neutron generator (Power of 10 n/s)	Isotopic neutron source	Gamma source (>50 curies), Ci	Digital	Analog (no. of amplifiers)	Reactor simulator	Atomic and nuclear physics	Radio and nuclear chemistry	Health physics; radiobiology	Nuclear technology	Radiation hazards control	Reactor materials	Reactor fuel technology	Thermonuclear; plasmas	Radioisotope techniques	Other (key at right)	INSTITUTION
						1U 5G										California, U of (San Diego)
11	●		IBM 360/75, 360/20, 1800; NOVA	40;75	●	2E			4U 1G	1U	1U 2G	1U 1G		1U		Califoroia, U of (Santa Barbara)
11	●		IBM 360/67; Univac 1108 PDP 8, 9	80	●	1E		1U	4U 14G	1G	1G	1G	7G			Carnegie-Mellon U
			IBM 1800; Univac 1108 PDP 8, 9, 10, 11			4U 3G							1U 2G		b	Case Western Reserve U
11	●	5,000	PDP 10; CDC 1604, 6600			4E 3G		4E	6U 8G	1E 2G			2G	1G		Catholic U of America
		1,900	PDP 10, 12, 15; Sigma 5	76				35G							f	Chicago, U of
8	●		IBM 1130	48	●	1E 3G			8E 6G	1G		2G	1E 1G	1E		Cincinnati, U of
10						1U		1U	2U							Citadel, The
	●		IBM 1130, 1620 RCA 70/46			1E	1E 1G	1E						1E		Clark U
	●		IBM 360/44; PDP 8	X		1U	2E		1U 1E					1E		Clarkson Coll of Tech
	●		PDP 10	X		2U 2G	2G	3G					1G	1G		Colorado Sch of Mines
11	●	200; 2,700 3,000	IBM 1401; CDC 6400			1G	3G	16G	1G					1E 1G		Colorado State U
	●		PDP 9, 8-L			4U 2G	1U	1U	1U				1U			Colorado, U of
10	●	200	IBM 360/91, 75 PDP 8, 11; SEL 810B			7U 5G	1E 1G	1G	5E 7G	2G	1E	1G				Columbia U
7	●	2,500	IBM 370/168; TRW X	X		5U 10G		2U 9G	2U 9G	1G		1G	4G		b	Cornell U
11	●		IBM 1130	X		2E 1G	1E	3E						1E		Creighton U
			Spectra 70/45	20 (5)		1E		1U 1E						1E		Dayton, U of
	●	500	Burr 6700, 5500 PDP 8, 8-E (2)			6U 3G	1G	1U	5E				1G			Delaware, U of
	●	2,000	Burr 6700			XE	XE		XE XG		XG		XE	XE	a	Denver, U of
8			IBM 370/135 Wang 360/370/380 HP 2100, 2810	8		3U 2G		3U								De Paul U
8	●		PDP 11			1U 2E		1U							b	De Pauw U
						XE	XE	XE	XU					XE		Drake U
12	●		Burr 2000, 5500 IBM 370/168; NOVA 1220			2U 1G		1G	2U 2G			1G			a	Drexel U
	●		CDC 3200 WANG 720C/702			2U		3U						1U		Duquesne U
9	●		IBM 360/40			3U 2G	1E 1G	1E 1G							e	East Texas State U

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INSTITUTION	REACTOR				ACCELERATOR (e = electron, p = positive ion, b = both)							ANALYZING EQUIPMENT																
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Emory and Henry Coll								p			0.15	1			●											
Emory U							e				25	1			●	●	●	●					●		●	
Florida State U						e p					3 20	8	●	●	●	●	●	●	●			●	●	●	●	
Florida, U of	Argonaut	100	11,t	2w		p					4	7	●		●	●	●	●	●	●			●	●		●
Georgetown U						p	p				0.4; 2 80; 120	4	●	●	●	●	●		●				●		●	
George Washington U												1		●									●			
Georgia Institute of Tech	GTRR	5,000	16,t	w		p					1	X	●		●	●	●	●	●	●	●	●	●	●	●	
Georgia, U of						p					10	8	●	●	●	●	●					●	●	●		
Hampton Institute																					●	●				
Harvard U							p			e	160 6,000	1			●		●		●						●	
Hawaii, U of																										
Hofstra U												5			●		●		●			●	●			
Houston, U of						e					1.2	2		●	●	●	●		●			●	●			
Idaho State U	AGN-201	0.0001	5,t	w								2		●			●		●						●	
Idaho, U of				w								2	●	●	●	●	●	●	●		●		●		●	
Illinois Institute of Tech																										
Illinois, U of (Chicago)												1			●	●	●				●		●		●	
Illinois, U of (Urbana)	TRIGA ADV	1,500	10,t	g,hw 2w	p	e					0.15 3,10	X	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Indiana State U						e					3	X	●	●	●	●	●	●	●		●	●	●		●	
Indiana U							p				200	3			●	●		●			●		●			
Indiana U of Pennsylvania						p					4	2		●	●		●	●	●			●	●			
Iowa State U	UTR-10	10	2,t	g w						e	70	X	●	●	●		●	●	●	●	●	●	●	●	●	
Iowa, U of				w		p					6; 14	3	●	●	●	●	●					●	●		●	●
John Carroll U												1						●	●				●		●	
Kansas State Teachers Coll														●									●		●	

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	●		PDP 8-I			2U										Emory and Henry Coll
		3,000 6,500	IBM 1620; PDP 10 Spectra 70/46, 55	X		3U 3G	2G	4G		3G				2G	b	Emory U
X		X	DC 6024/3; EMR 6130 SPC 16; CDC 6400 IBM 1401			5U 8G	2E 3G	2E 3G						1E 1G	b, e f	Florida State U
11	●	250; 800 6800; 110000	IBM 1800, 360/70 GA 1830	32; 80		5U 4G		7U 6G	15U 15G	2G	1G	1E	1U 5G	4U 2G	f	Florida, U of
			PDP 8E, 8L IBM 370/145			XU XG		XU XG	XE					XU XG		Georgetown U
			IBM 360			1E 1G										George Washington U
11	●	12,000 100,000	Univac 1108-II Burr 5500; PDP 8 (2)			7U 5G	7E 6G	15U 13G	14U 12G	3U 4G	3U 1G	1E 3G	2G	1U 3G	b e	Georgia Institute of Tech
	●		PDP 9-L			XU XG		XE XG						XE XG		Georgia, U of
						XU		XU								Hampton Institute
8	●	10,000	IBM 370/165			3G		5G	2G	2G	1G			1G		Harvard U
	●		IBM 360/64, 7040			3U 1G										Hawaii, U of
9	●	100	Spectra 70/46			12U 2G		1U								Hofstra U
	●		Univac 1108, 9400 IBM 360/40			1U 2G										Houston, U of
			IBM 1130, 370/125	15; 24		2E 2G	3E 1G	1U	5E 9G	3G		1G			a	Idaho State U
9	●		IBM 360/40; PDP 8	40; 50		2U 2G	3E	1U 1G	3U 3G		1G	1G			b	Idaho, U of
			Univac 1108; PDP 10			3U 2G		1E								Illinois Institute of Tech
			IBM 360/65			3E 6G	2E 1G	1E	3G	1E	1E			2E 1G	b	Illinois, U of (Chicago)
11 (2)	●	10,000	IBM 7094, 360/75 ILLIAC II; CDC 1604	90		15U 14G	2E 1G	2E 7G	2E 14G	2E 1G	2G	1E	1E 2G	1E 1G	b	Illinois, U of (Urbana)
X	●	10,000	IBM 7090, 360/50 PDP 8-I			3U 2G		5U 1G						3E	g	Indiana State U
			Sigma 2, 5; CDC 6600 PDP 15; HP 2114A DATA 6024-1			2U 5G		1U								Indiana U
	●		IBM 360; RCA 116A	20		XU XE	XU	XU								Indiana U of Pennsylvania
11	●		IBM 360/65	X		12U 3G	2U	2U 2E	1U 10E	3E 1G	1E 3G	2E	3E			Iowa State U
7			IBM 360/65; CDC 1604	20; 48	●	3U 4G	1E 1G	6G	2E 1G	2E 2G			2E 1G	1G		Iowa, U of
8			Burr 5700			2E	1E									John Carroll U
	●		IBM 1401	9		3E	1E	1E						1E	b	Kansas State Teachers Coll

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Kansas State U	TRIGA II	250	4,t	g								1	●				●	●	●	●		●			●		
Kansas, U of	pool	10kw	4,t				p				4	X	●	●	●	●	●	●	●			●	●		●		
Kent State U (member User's Group)												5	●	●	●		●	●			●		●		●		
Kentucky, U of			w		e	p					0.25 6	4	●		●	●	●		●			●	●		●	●	
Lamar U																											
Loma Linda U				w par.																							
Louisiana State U (Baton Rouge)				w								4	●	●	●	●	●	●	●		●	●	●		●		
Louisiana State U (New Orleans)												4	●	●			●	●				●	●	●	●		
Louisiana Tech U				w								1					●	●			●				●		
Louisville, U of								e	e		25 4	3	●	●	●	●	●	●	●			●	●		●	●	
Lowell Tech Institute	pool	1,000	6,t			p					5.5	6	●	●	●	●	●	●	●				●		●		
Loyola Marymount U												1			●	●							●				
Maine, U of												1			●		●	●			●		●		●		
Manhattan Coll	pool	0.0001		g w								3										●	●				
Maryland, U of	pool	10	4,t	w		p e	p		e		3;150 0.4;10	3	●		●	●	●	●	●				●		●		
Massachusetts Institute of Tech	h. water	5,000	38,t	w,g hw	p						0.15	1					●	●	●	●		●	●				
Massachusetts, U of						p					0.4	3			●	●	●						●				
Memphis State U												2		●	●		●		●			●	●				
Merrimack Coll												1		●			●		●								
Miami, U of									e		13				●				●		●	●	●		●		
Michigan Tech U				w								1	●	●	●		●	●	●		●		●		●		
Michigan, U of	pool	2,000	10				p		p		46 0.15	5	●	●	●	●	●	●	●	●	●	●	●	●	●		
Middle Tennessee State U												1			●		●	●			●	●	●				
Mississippi State U				w								3		●	●	●	●		●		●	●	●		●		
Mississippi, U of				w		b					2.5	2			●	●	●	●	●		●	●	●		●		

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11	●	2,000	IBM 360/50			4E	2E 1G		10E 5G	1E 1G	1E	2E	1E 2G	2E		Kansas State U
	●	500, 1,000 1,100	IBM 1620; HW 635	20, 40, 80		4U 3G		6U 3G	1E	5G			1G	2E	b f	Kansas, U of
X	●		IBM 1130; PDP 11 Burr 5500; Epic 2000			2E 1G										Kent State U
10, 11	●		IBM 360/65	10		7U 7G	1E 1G	6E	1U 5G	2E 1G	2E	1U			a	Kentucky, U of
			CDC 3300				2U		1E 1G							Lamar U
			IBM 360/50			XU 2G			XU							Loma Linda U
10	●	5,000 20,000	IBM 360/65 L PDP 8E, 8L	26		2U 2G	1E 1G	1G	3E 3G	1E 1G	1G			4U 2G	g	Louisiana State U (Baton Rouge)
6	●		PDP 8, 10, 12			XE	XE	XE	XU							Louisiana State U (New Orleans)
	●	15,000	IBM 1620, 370/5	15 (7); 16 66		2U 2E	1U		1E	1E				1U 1E		Louisiana Tech U
10	●	5,000	IBM 1130, 360/40 PDP 9 (2), 12A; HP 2000A	16 (2); 20 32		2U 1G		2U 3G	1E 1G					1U 1E		Louisville, U of
10		3,700	IBM 1620; PDP 9			5U 2G	2U	7U 6G	4U 5G	1U 2G						Lowell Tech Institute
	●		IBM 360/22	18; 48		2U	1U		1G							Loyola Marymount U
	●		IBM 1800, 370/X	30		3E 2G		1E 2G	1G	1G						Maine, U of
	●		CDC 8090	20 (2)		2U	2U	5U	2U	2U				1U		Manhattan Coll
9	●	20,000	IBM 7094, 360/44 Univac 1108	48 (2)		3E 2G	2U 5G	1U 1E	3U 13G	2G				1E	b	Maryland, U of
			IBM 370/155, 360/167			5U 11G		1G	11G	3G	4G	2G	7G		a	Massachusetts Institute of Tech
	●	1,000 50,000	CDC 3600			XU XG		XU XG								Massachusetts, U of
11	●		PDP 8, 15; Sigma 9	20; 48		XE		XE	XU							Memphis State U
6; 8	●		IBM 1130; HP 9100B			2U		1U	1U							Merrimack Coll
	●	3,000	Univac 1106; PDP 8, 11	7		2U 1G		1E 4G		1G				1G	b	Miami, U of
11	●	300	Univac 1110	X	●	3E 2G	1E		4E		1E			1E		Michigan Tech U
7	●	4,000	IBM 360/67			3U 2G		1E	10U 8G	1G	1U 1E		1U 4G			Michigan, U of
			GE 250			2E		2E								Middle Tennessee State U
11	●	100	Univac 1106; HP 9100	X		1U	1E	1E	5U 3G	1E 1G	1E			1E		Mississippi State U
	●	2,500	PDP 8, 10, 12	X (2); 30		2U 2G	1E 2G	1U 2G	3E 2G					1G	b,g h	Mississippi, U of

INSTITUTION	REACTOR				ACCELERATOR (e = electron, p = positive ion, b = both)							ANALYZING EQUIPMENT														
	Type	Power (kW)	Beam holes, t=thermal column	Subcritical, graphite or water	dc generator	Electrostatic	Cyclotron, all types	Betatron	Linear	Synchrotron	Energy (max, MeV)	Multichannel (>99 ch.)	Multiparameter	Mössbauer	Coincidence	Angular correlation	Detectors, Si or Ge(Li)	Low-level counting	Activation analysis	Neutron diffraction	Cloud, bubble, spark chambers	Mass spectrometer	NMR or ESR	Molecular beam	Microscopy, electron/field ion	Whole-body counter
Missouri, U of (Columbia)	pool	10,000	6,t	w	p	e					0.15 2	4	●		●		●	●	●	●		●			●	●
Missouri, U of (Rolla)	pool pool	200 5,000	1,t 6,t	w	p	e					0.25 1.25	2	●	●	●	●	●	●	●	●	●	●	●	●	●	
Montana State U					p	p					0.15 4	1			●	●	●	●	●			●	●	●	●	
Murray State U				g		b					2	3	●		●		●	●	●			●	●			
Nebraska, U of				w	p						0.4	2	●		●	●	●	●				●	●	●		
Nevada, U of	L-77	0.01	7	w		b					1.5	4		●	●	●		●	●						●	
New Hampshire, U of						p					0.5	2	●	●	●	●	●	●	●				●	●		
New Mexico Institute of M & T												X														
New Mexico State U						p			e		0.15 25	2			●		●						●		●	
New York State U (Buffalo)	Pulstar	2,000	7,t	w		p e					0.4 1.5	X	●	●	●	●	●	●	●	●		●	●		●	
New York State U (Maritime)				w								1	●		●		●		●				●			
Newark Coll of Engineering				w								1	●												●	
North Carolina State U	Pulstar	1,000	6,t	w								4	●	●	●		●	●	●	●		●	●	●	●	
North Carolina, U of					p	b					0.03 2	4	●	●	●	●	●						●		●	
North Dakota State U									p e		0.35 0.5	2			●	●	●	●	●		●	●	●		●	
Northeastern U				w																						
Northern Colorado, U of												1						●					●			
Northern Illinois U												3		●	●	●	●	●				●	●			
Northwestern U				w		p					0.4	2			●	●	●	●	●							
Notre Dame, U of				g		b e			e		4.7e;4.15p 2;7	3	●	●	●	●	●				●	●	●			
Occidental Coll			w									1						●	●				●			
Ohio State U	pool	10	2,t	g w		p		e	p		6.5 25	3		●	●	●	●	●	●		●	●	●	●	●	
Oklahoma, U of	AGN-211	0.015	3,t	w						e	60	1		●	●		●	●	●		●				●	
Old Dominion U												1						●					●			
Oregon State U	TRIGA II AGN-201	1,000 0.0001	4,t 5,t	g	p		p				0.15 20	9	●	●	●	●	●	●	●	●	●	●	●		●	

RADIATION SOURCE			COMPUTER			NUCLEAR COURSES AVAILABLE U = Undergraduate G = Graduate E = Either, unless both U&G are used										KEY TO OTHER COURSES a = Environment and nuclear power b = Geochemistry c = Materials safeguards d = Nuclear explosives e = Nuclear geology f = Nuclear medicine g = Radiation chemistry h = Radiopharmacy	
Neutron generator (Power of 10 n/s)	Isotopic neutron source	Gamma source (>50 curies), Ci	Digital	Analog (no. of amplifiers)	Reactor simulator	Atomic and nuclear physics	Radio and nuclear chemistry	Health physics; radiobiology	Nuclear technology	Radiation hazards control	Reactor materials	Reactor fuel technology	Thermonuclear; plasmas	Radioisotope techniques	Other (key at right)	INSTITUTION
11	●	5,000	IBM 370/165; SEL 800 PDP 8 (2)	10; 48		3U 5G	1E 1G	3E	7E 8G	3E 1G	2E	2E	1E 1G	2E	b c	Missouri, U of (Columbia)
11	●	5,600	IBM 360/50, 370/165	20 (4); 48 (3)		3U 11G	2E 2G		9U 11G	5E 2G	4E 1G	1U 1E	2E 3G	1U 1E	b,d e	Missouri, U of (Rolla)
	●	100	Sigma 7; IBM 360/25 HP 2115A, 2116A, B PDP 9, 11			3U 3G		1E	1E	1G				1G		Montana State U
	●		IBM 1130, 360/40 Wang 700A			XU XG	XU XE	XU XG	XU					XE		Murray State U
	●		IBM 360/50	X		4E 4G	2G		3U 2G	1E	1E					Nebraska, U of
11	●		PDP 8; CDC X TI 980-A		●	2E	1E		1E 3G	1E		1G	1G	1E	b	Nevada, U of
	●		IBM 360/ts PDP 8E; HP 9800-10			1E 1G	2G		1E							New Hampshire, U of
			IBM 360/40			XE										New Mexico Institute of M & T
10	●		IBM 1130, 360/65			5U 4G	2E 1G		2E							New Mexico State U
10	●		CDC 6400						3E 3G	1G	1G					New York State U (Buffalo)
8	●		IBM 1130	X	●	4U	1U		5U		1U					New York State U (Maritime)
	●		SPEC 70		●	1U 1G	1G		3U 3G							Newark Coll of Engineering
	●	30,000	IBM 1130; 360/40, 370/165	20; 48		5U 3G	1E	4U 1G	7U 5G	1U 1G	2E 1G	1U	1E 1G	2U 1G		North Carolina State U
		10,000	IBM 360/75, 370/165 PDP 12			1E 3G	2E	4E 5G		2G						North Carolina, U of
7; X	●	87; 10,000	IBM 1620, 360/50 PDP 8			XU XG	XU XG	XU XG	XU	XE				XE		North Dakota State U
			CDC 3300		●	6G			2U 2E							Northeastern U
	●		IBM 360			XE		XE								Northern Colorado, U of
	●		IBM 360/67			6G	3E	1E 1G	1E					1E		Northern Illinois U
	●		CDC 6400; PDP 8 Wang 720	X		6E		6E 5G	3E 18G	2G	1G		1E			Northwestern U
	●	1,000 10,000	IBM 370/158; PDP 9 GA 18/30	9 (4); 15 32		3U 1G		1U 1G	4U 5G	1E 1G						Notre Dame, U of
	●		IBM 1620 II	20		2U			1U							Occidental College
	●	5,000	IBM 1130, 370/165 PDP 8, 14	25; 40 (2)		2U 1G	2E	23U 6G	9U 6G	3U 1G	1E	1G	1E	1E		Ohio State U
	●	150;500	IBM 360/50 PDP 8	50	●	1E 1G		3E 2G	7E 8G	1E 1G		1E	1G	2E 2G		Oklahoma, U of
	●		IBM 1130, 360 Univac 70/45	14		1U 3G		2U 1G	2U 1G	1E					b	Old Dominion U
11	●	1,000	PDP 9; ND 812 CDC 3300	9; 22; 28 22	●	5U 9G	2U 6G	14U 13G	22U 4G	4U	2E	1U		2E 1G	a b	Oregon State U

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	Type	Power (kW)	Beam holes, t=thermal column	Subcritical, graphite or water	dc generator	Electrostatic	Cyclotron, all types	Betatron	Linear	Synchrotron	Energy (max. MeV)	Multichannel (>99 ch.)	Multiparameter	Mössbauer	Coincidence	Angular correlation	Detectors, Si or Ge(Li)	Low-level counting	Activation analysis	Neutron diffraction	Cloud, bubble, spark chambers	Mass spectrometer	NMR or ESR	Molecular beam	Microscopy, electron/field ion	Whole-body counter
Oregon, U of						p					4.2	2	●	●	●	●	●	●	●				●		●		
Pacific Union Coll				w								1					●		●		●		●				
Pennsylvania State U	TRIGA III	1,000	3,t	g		p					6	6			●	●		●	●						●		
Pennsylvania, U of						p					12	1	●	●	●	●	●	●			●	●	●				
Princeton U					p		p				0.05 56	2	●	●	●	●	●	●			●		●	●	●		
Puerto Rico, U of	L-77 TRIGA	0.01 1,400	5,t 5,t	g								6	●		●	●	●	●	●	●		●	●		●	●	
Purdue U	pool	1		g		p					16	X	●	●	●	●	●	●	●		●	●		●	●	●	
Rensselaer Poly Institute (Conn.)																											
Rensselaer Poly Institute (Troy)	tank	0.1		w					e		100	1	●				●		●				●				
Rhode Island, U of	pool	2,000	6,t	w								3	●	●	●	●	●	●	●	●	●	●	●		●		
Roanoke Coll					b						0.3	1			●		●		●								
Rochester, U of												1	●	●	●	●	●	●	●				●	●	●	●	
St. Bonaventure Coll																							●				
St. John's U												1		●	●	●	●										
Sam Houston State U												1		●			●		●				●				
Seattle Pacific Coll															●		●				●		●				
Seattle U				w								2		●	●	●	●	●	●		●		●		●		
South Carolina, U of				w		b					0.45	3	●	●	●	●	●	●	●			●	●		●		
Southern California, U of							p				50	4	●	●	●	●	●	●	●			●			●		
Southern Methodist U						p					2	4			●		●	●	●				●		●		
Southwestern Louisiana, U of												4		●	●	●	●						●		●		
Stanford U				w		p			e		18 20,000	2	●	●	●	●	●	●	●	●	●		●	●	●	●	
Stephens Institute of Tech				w								2		●	●							●			●		
Syracuse U						p					1			●	●						●	●	●	●			
Temple U												2		●	●		●				●		●				

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Neutron generator (Power of 10 n/s)	Isotopic neutron source	Gamma source (>50 curies), Ci	Digital	Analog (no. of amplifiers)	Reactor simulator	Atomic and nuclear physics	Radio and nuclear chemistry	Health physics; radiobiology	Nuclear technology	Radiation hazards control	Reactor materials	Reactor fuel technology	Thermonuclear; plasmas	Radioisotope techniques	Other (key at right)	INSTITUTION
			IBM 360/50; PDP 7, 10			2U 2G		1U								Oregon, U of
	●		HP 2000E; Burr 1726	X		2U		1U								Pacific Union Coll
11	●	10,000 70,000	IBM 360/20, 370/165 PDP 9	30; 52 72; 120		5U 5G	1U		9U 5G	1E 2G			1U 3G	1E		Pennsylvania State U
			IBM 360/75; PDP 9			3U 2G									b e	Pennsylvania, U of
			IBM 360/91; HP 2116 Sigma II; PDP 9, 15			3U 5G			1E				1E 7G		b	Princeton U
11	●	1,200	IBM 1620; PDP 10	60	●	1E 2G	1E 1G	7G	11U 10G	2G				2G		Puerto Rico, U of
10; 11	●	1,500 7,500	IBM 7094 (2) CDC 6500; PDP 15/30	4; 45		6U 3G	1E 1G	3E 3G	11U 10G	2G	1E	1E	1G	4E 1G	b h	Purdue U
						XG			XG		XG	XG				Rensselaer Poly Institute (Conn.)
	●		IBM 1130, 360/50 PDP 7, 15			4U 4G	1E 1G	2E 3G	8U 9G	1G	1G	1E 1G	2G	1E	f	Rensselaer Poly Institute (Troy)
	●		IBM 370/155 NOVA 1200	40	●	5U 2G	2G	1G	8G	1G		1G				Rhode Island, U of
	●					2U	1U									Roanoke Coll
10	●	1,000	IBM 360/44 PDP 7A, 8, 12	22		1G	1G	6G						1G		Rochester, U of
	●		IBM 1620			1E 2G		1G								St. Bonaventure Coll
			HW H1250			4U 2G		1E 2G								St. John's U
	●		IBM 365/40			2U 2G										Sam Houston State U
	●		PDP 11/20, 11/45	18		3U										Seattle Pacific Coll
8	●	5,000	HW H105	12		XU	XU		XU							Seattle U
	●		IBM 7040, 360/65 PDP 11/20, 11/45	40		4U 6G			1E							South Carolina, U of
	●		IBM 370/158			2E 2G	1E	2G					2G		h	Southern California, U of
10	●		CYBER 72			2U 3G										Southern Methodist U
8			IBM 1620, 360/10 Spectra 70-46			2E 1G	1E		1E					1E		Southwestern Louisiana, U of
11	●		IBM 360/67; HP 2116 PDP 6/10, 7, 9	30		5U 6G	2E	2E 2G	1E 5G		1G		2G	1E	b	Stanford U
	●	500; 1,500	PDP 5, 10			4U 7G		1G					1G		g	Stephens Institute of Tech
	●		IBM 370; PDP 10 NOVA 1200			2E 3G		2E 3G								Syracuse U
			CDC 6400-I, 6400-II PDP 11			1U 2G										Temple U

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Tennessee Tech U			g w									1							●				●		●	
Tennessee, U of (Chattanooga)						p					0.5	2					●	●	●		●					
Tennessee, U of (Knoxville)				g w		p					0.3	4	●	●	●	●	●	●	●		●		●		●	
Texas A & M U	AGN-201 pool	0.005 1,000	4 7,t	w	p		p				0.2 60	8	●		●	●	●	●	●		●					
Texas A & I U													●								●					
Texas Christian U					e						0.15	1			●		●						●		●	
Texas, U of (Austin)	TRIGA I	250		●		p					1,4,5.5 12	X	●	●	●		●	●	●				●		●	
Tulsa, U of												3	●	●	●		●	●					●			
Tuskegee Institute	AGN-201	0.0001	4,t	g w								2			●		●	●	●						●	
Union Coll						p					0.4	1		●	●	●	●	●	●		●		●		●	
Utah State U				w								1					●		●						●	
Utah, U of	TRIGA I	100	3						e		100	2					●		●		●	●	●		●	●
Valparaiso U				w					p		0.4	1		●	●		●				●	●	●			
Vanderbilt U				w					e		6	2	●	●	●	●	●	●				●	●		●	
Vermont, U of												1		●	●	●	●						●		●	
Villanova U				w								2						●				●	●			
Virginia Military Institute				w	p						0.15	1			●		●	●	●							
Virginia Poly Institute and State U	Argonaut	100	4,t	g w	p	p					0.25 4	3	●	●	●	●	●		●	●		●	●			
Virginia, U of	pool	2,000	4,t	w		p					6	4			●		●	●	●		●			●	●	
Washington and Lee U																	●						●			
Washington State U	TRIGA III	1,000	10,t	w					p		0.35,2	5	●	●	●	●	●	●	●	●	●	●	●		●	
Washington, U of	Argonaut	100	8,t			p	p				24.6 10.5	4	●	●	●		●	●	●			●	●	●		●
Wesleyan U																							●			
West Virginia Institute of Tech				g										●									●			
West Virginia U	AGN-211p	0.075	3,t	w								2	●		●	●	●	●	●		●	●	●		●	

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Neutron generator (Power of 10 n/s)	Isotopic neutron source	Gamma source (>50 curies), Ci	Digital	Analog (no. of amplifiers)	Reactor simulator	Atomic and nuclear physics	Radio and nuclear chemistry	Health physics; radiobiology	Nuclear technology	Radiation hazards control	Reactor materials	Reactor fuel technology	Thermonuclear; plasmas	Radioisotope techniques	Other (key at right)	INSTITUTION
	●		Sigma 6	10; 12; 60		2E	2E		6E	1E						Tennessee Tech U
	●	2,000	IBM 360			3U		1U	1U	1U	1U					Tennessee, U of (Chattanooga)
7	●		IBM 360/65; PDP 11 CDC 160A	48		3U 6G	2E	3U 6G	11U 10G	1U 3G	1U	1U	1U 1G			Tennessee, U of (Knoxville)
9	●	400; 3,000 35,000	IBM 650/65, 7094/1401 CDC 1610, 1620 PDP 15/40; NOVA 1200			XU XG	XE XG	XU XG	XU XG	XU XG	XU XG	XG	XG	XU XG		Texas A & M U
			IBM 360/50; HP 9100B			2E										Texas A & I U
			IBM 1401, 1800, 360/20			2U 2G										Texas Christian U
10	●	5,000	CDC 6400, 6600 NOVA 800			3U 11G		1U 5G	2U 12G	1G	2G		2G			Texas, U of (Austin)
	●		Sigma 6	X		XU	XE								b	Tulsa, U of
11	●	1,900	IBM 1401, 1620 HP 2000F	8 (10); 10 (2) 20; 100	●	1E		2E	1E 3G	2G	2G			2E		Tuskegee Institute
10	●	500	GE 415	24		2E	1E	2E	1E 4G					1E		Union Coll
10	●	250	IBM 1620, 360 Univac 1108; Burr B6700	64		1G		2E 1G	5E	1E	2E	1E		1E		Utah State U
11	●	500	IBM 360/65; Univac 1108 PDP 10 (2)	2; 20; 100		3U 2G	2U 1E	5U 5G	13U 2G	1U 1E	1U 1E		1G	1E 1U		Utah, U of
11	●		IBM 1710; PDP 8		●	2U			3U							Valparaiso U
	●	5,000	IBM 1800; Sigma 7 HP 2115A; PDP 8-I, E	24		5U 2G		4U 2G	1U		1U					Vanderbilt U
	●		IBM 1130, Sigma 6 PDP 8-E			2E		2E								Vermont, U of
	●		IBM 360/30			2U			1U							Villanova U
10	●		IBM 1620; Burr B5500	15; 60		3U			1U	2U						Virginia Military Institute
7	●	120	PDP 8-E, I, L (2)	64	●	1E 1G	2G	1E	6E 8G			1G	1E	1E		Virginia Poly Institute and State U
6		70,000	CDC 6400; HP 2000 Burr 5500	80		3U 3G	2U 1G	4U 8G	12U 10G	2U 1G	1E		1U	1U	b	Virginia, U of
	●		IBM 1130; PDP 8	15		2U										Washington and Lee U
11	●	12,000	IBM 360/67; PDP 8, 15	15; 16; 30		4U 3G	1U 2E	8U 5G	3U 2G	1G				1G	b	Washington State U
11	●		VAR 620; XDS 930 CDC 6600			8U 10G	7E	2E 9G	8E 9G	1E 3G	2E	1G	2G	2E	b	Washington, U of
						2U									b	Wesleyan U
						XU										West Virginia Institute of Tech
11	●	300; 6,000 21,000	IBM 1401, 1620, 360/75	48	●	5U 4G	2E 1G	4U 3G	4U 2G	2E 1G					b	West Virginia U

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Western Michigan U						p					12	X	●	●	●	●	●						●	●		
William and Mary, Coll of					p e		b		e		0.1;600 3,12	5	●	●	●	●	●				●		●	●	●	
Wisconsin, U of (Madison)	pool	1,000	4,t	w	p	p e				e	0.15;12 2;50	4	●		●	●	●		●	●	●	●	●		●	
Worcester Poly Institute	pool	10	1,t			p					2	4	●	●	●	●	●		●			●	●		●	
Wyoming, U of												4		●			●	●	●			●	●			
Youngstown State U				w								1		●	●		●	●	●			●	●		●	

RADIATION SOURCE			COMPUTER			NUCLEAR COURSES AVAILABLE U = Undergraduate G = Graduate E = Either, unless both U&G are used										KEY TO OTHER COURSES a = Environment and nuclear power b = Geochemistry c = Materials safeguards d = Nuclear explosives e = Nuclear geology f = Nuclear medicine g = Radiation chemistry h = Radiopharmacy	
Neutron generator (Power of 10 n/s)	Isotopic neutron source	Gamma source (>50 curies), Ci	Digital	Analog (no. of amplifiers)	Reactor simulator	Atomic and nuclear physics	Radio and nuclear chemistry	Health physics; radiobiology	Nuclear technology	Radiation hazards controls	Reactor materials	Reactor fuel technology	Thermonuclear; plasmas	Radioisotope techniques	Other (key at right)	INSTITUTION
			PDP 10, 15			4U 1G										Western Michigan U
X	●	420	IBM 360/44, 50			3U 6G	1E 1G	1U 1G					1G	1U		William and Mary, Coll of
11	●	1,000; 2,000 10,000	IBM 1401, 7094 Univac 1108 (2), 9300 HW PDP 124; RAD 8 PDP 8, 8E, 8/6, 11/20, 12A			11U 10G	2E 2G	10E 4G	14U 8G	3E	3E 3G	1E 1G	3E 2G	2E	a b	Wisconsin, U of (Madison)
	●		Spectra 70/46 PDP 7, 8L, 10	8; 18; 20 30		3U 3G	1U		2E 1G	2E				1E		Worcester Poly Institute
	●		Sigma 7			1E 2G	1E 1G		2E 3G					1U		Wyoming, U of
	●		IBM 360/40, 50			2E	1E 2G		7U 1G	1U						Youngstown State U

Table III

TECHNICIAN TRAINING INSTITUTIONS

(Technology Programs Listed in Italics)

ALABAMA

S. D. Bishop State Junior College —*Radiation*
351 N. Broad Street
Mobile, Alabama 36603

ARIZONA

Maricopa Technical College—*Radiologic*
106 E. Washington Street
Phoenix, Arizona 85004

CALIFORNIA

Anaheim Adult School—*Radiological Monitoring*
P. O. Box 3520
Anaheim, California 92803

Antelope Valley College—*Radiation*
3041 W. Avenue K
Lancaster, California 93534

Bakersfield College—*Radiation*
1801 Panorama Drive
Bakersfield, California 93305

Chabot College—*Radiation*
25555 Hesperian Boulevard
Hayward, California 94545

Long Beach City College—*Radiation*
4901 E. Carson Street
Long Beach, California 90808

Los Angeles City College—*Radiation*
855 N. Vermont Avenue
Los Angeles, California 90029

Los Angeles Pierce College—*Radiation*
6201 Winnetka Avenue
Woodland Hills, California 91368

Los Angeles Valley College—*Nucleonics*
5800 Fulton Avenue
Van Nuys, California 91401

Mt. San Antonio College—*Radiation*
1100 N. Grand Avenue
Walnut, California 91789

Napa College—*Radiation*
2277 Napa-Vallejo Highway
Napa, California 94558

Phineas Banning Adults School—*Nucleonics*
1500 N. Avalon Boulevard
Wilmington, California 90744

Santa Rosa Junior College—*Radiologic*
1501 Mendocino Avenue
Santa Rosa, California 95401

University of Southern California—*Radiation*
University Park, California 90007

COLORADO

Adams State College—*Radiation*
Alamosa, Colorado 81101

Community College of Denver—*Radiation*
North Campus
1001 E. 62nd Avenue
Denver, Colorado 80216

Mesa College—*Radiologic*
1120 N. Avenue
Grand Junction, Colorado 81501

Southern Colorado State College—*Radiologic*
2200 Bonforte Boulevard
Pueblo, Colorado 81001

CONNECTICUT

E. C. Goodwin Technical School—*Nucleonics*
735 Slater Road
New Britain, Connecticut 06553

Hartford State Technical College—*Nuclear*
401 Flatbush Avenue
Hartford, Connecticut 06106

Quinnipiac College—*Radiation*
Mount Carmel Avenue
Hamden, Connecticut 06518

FLORIDA

Broward Community College—*Radiation*
3501 S.W. Davie Road
Fort Lauderdale, Florida 33314

Central Florida Community College—*Radiological Health*
P. O. Box 1388
Ocala, Florida 32670

Hillsborough Community College—*Nuclear Medicine*
4011 N. Lois
Tampa, Florida 33622

Santa Fe Community College—*Radiation*
3000 N.W. 83rd Street
Gainesville, Florida 32601

HAWAII

Kapiolani Community College—*Radiation*
620 Pensacola Street
Honolulu, Hawaii 96814

IDAHO

Eastern Idaho Vocational-Technical School—*Nucleonics*
2299 E. 17th Street
Idaho Falls, Idaho 83401

ILLINOIS

Central YMCA Community College–*Radiation*
211 W. Wacker Drive
Chicago, Illinois 60606

City College of Chicago–*Radiation*
Malcolm X Campus
1900 W. Van Buren Street
Chicago, Illinois 60612

College of DuPage–*Radiation*
Lambert Road at 22nd Street
Glen Ellyn, Illinois 60137

Parkland College–*Radiologic*
2 Main Street
Champaign, Illinois 61820

Thornton Community College–*Radiation*
50 W. 162nd Street
South Holland, Illinois 60473

Triton College–*Nuclear Medicine*
2000 Fifth Avenue
River Grove, Illinois 60170

INDIANA

Indiana Vocational-Technical College–*Radiologic*
1315 E. Washington Street
Indianapolis, Indiana 46202

Indiana University–*Radiation (2 and 4 year programs)*
1100 W. Michigan Street
Indianapolis, Indiana 46202

KANSAS

Haskell Indian Junior College–*Applied Radiation*
Lawrence, Kansas 66044

KENTUCKY

Northern Kentucky State College–*Radiation*
Highland Heights, Kentucky 41076

LOUISIANA

Louisiana State University–*Industrial with nuclear science*
Baton Rouge, Louisiana 70803 *option (4 year program)*

MARYLAND

Community College of Baltimore–*Radiation*
2901 Liberty Heights Avenue
Baltimore, Maryland 21215

Essex Community College–*Nuclear Medicine*
P.O. Box 9596
Baltimore, Maryland 21237

Hagerstown Junior College–*Radiation*
751 Robinwood Drive
Hagerstown, Maryland 21740

Montgomery College–*Nuclear Medicine, Radiation*
Takoma Park Campus
Takoma Avenue and Fenton Street
Takoma Park, Maryland 20012

MASSACHUSETTS

Lowell Technological Institute–*Radiological*
1 Textile Avenue *(2 and 4 year programs)*
Lowell, Massachusetts 01854

Quinsigamond Community College–*Radiation*
670 W. Boyleston Street
Worcester, Massachusetts 01606

Springfield Technical Community College–*Nuclear Radiologic*
One Armory Square
Springfield, Massachusetts 01105

MICHIGAN

Ferris State College–*Nuclear Medicine, Radiation*
Big Rapids, Michigan 49307

Lansing Community College–*Cyclotron Maintenance,*
419 N. Capitol Avenue *Radiologic*
Lansing, Michigan 48914

Madonna College–*Nuclear Medicine*
36600 Schoolcraft Road
Livonia, Michigan 48150

Oakland Community College–*Radiation*
Highland Lakes Campus
7350 Cooley Lake Road
Union Lake, Michigan 48085

Washtenaw Community College–*Radiation*
4800 E. Huron River Drive
Ann Arbor, Michigan 48107

MISSOURI

Junior College District of St. Louis–*Radiation*
5801 Wilson Avenue
St. Louis, Missouri 63110

Penn Valley Community College–*Radiation*
3201 W. Trafficway
Kansas City, Missouri 64111

NEBRASKA

University of Nebraska–*Radiation (2 and 4 year programs)*
3835 Holdrege
Lincoln, Nebraska 68503

NEW JERSEY

Mercer County Community College–*Radiological*
1200 Old Trenton Road
Trenton, New Jersey 08690

NEW MEXICO

University of New Mexico–*Nuclear Medicine, Radiologic*
Albuquerque, New Mexico 87131

NEW YORK

Erie Community College-City Campus–*Radiologic*
1309 Main Street
Buffalo, New York 14209

NEW YORK (continued)

Westchester Community College—*Radiation*
75 Grasslands Road
Valhalla, New York 10595

NORTH CAROLINA

Forsythe Technical Institute—*Nuclear Medicine, Radiation*
2100 Silas Creek Parkway
Winston-Salem, North Carolina 27103

University of North Carolina—*Nuclear Medicine, Radiation*
Chapel Hill, North Carolina 27514 *Therapy, Radiological*

OHIO

Michael J. Owens Technical College—*Radiation*
30335 Oregon Road
Perrysburg, Ohio 43551

University of Cincinnati—*Medical Radioisotope*
Cincinnati, Ohio 45221

University of Cincinnati—*Radiation*
Raymond Walters Branch
Plainfield Road
Cincinnatti, Ohio 45236

OREGON

Lane Community College—*Radiation*
4000 E. 30th Avenue
Eugene, Oregon 97405

Oregon Institute of Technology—*Medical Radiologic, Radiologic Electronics (2 and 4 year programs)*
Oretech Branch Post Office
Klamath Falls, Oregon 97601

PENNSYLVANIA

Pennsylvania State University—*Nuclear Engineering*
Altoona, Pennsylvania 16003

SOUTH CAROLINA

Berkeley-Charleston-Dorchester Technical Education Center—*Nuclear Radiologic*
7000 Rivers Avenue
North Charleston, South Carolina 29405

Midlands Technical Education Center—*Nuclear Engineering*
316 Beltline Boulevard
Columbia, South Carolina 29250

SOUTH CAROLINA (continued)

Spartanburg County Technical Education Center—*Radiologic*
Drawer 4386
Spartanburg, South Carolina 29303

SOUTH DAKOTA

Lake Area Vocational-Technical School—*Radiologic*
320 11th Avenue, N.E.
Watertown, South Dakota 57201

TENNESSEE

Chattanooga State Technical Community College—*Nuclear Radiologic*
4501 Amnicola Highway
Chattanooga, Tennessee 37406

Martin College—*Radiation*
433 West Madison Street
Pulaski, Tennessee 38478

Shelby State Community College—*Radiologic*
3540 Summer Avenue
Memphis, Tennessee 38122

University of Tennessee—*Radiation*
Knoxville, Tennessee 37916

TEXAS

El Centro College—*Radiation*
Main and Lamar
Dallas, Texas 75202

Odessa College—*Radiation*
P. O. Box 3752
Odessa, Texas 79760

Paris Junior College—*Radiation*
2400 Clarksville Street
Paris, Texas 75460

South Plains College—*Radiation*
Levelland, Texas 79336

WASHINGTON

Bellevue Community College—*Radiologic*
3000 145th Place, S.E.
Bellevue, Washington 98007

Table IV

NATIONAL LABORATORIES

Ames Laboratory, (Iowa State University), Ames, Iowa
Argonne National Laboratory, Argonne, Illinois
Atomic Energy Project, (University of Rochester), Rochester, New York
Battelle Pacific Northwest Laboratory, Richland, Washington
Bettis Atomic Power Laboratory, West Mifflin, Pennsylvania
Brookhaven National Laboratory, Upton, New York
Knolls Atomic Power Laboratory, Schenectady, New York
Lawrence Radiation Laboratory, Berkeley, California
Lawrence Radiation Laboratory, Livermore, California
Los Alamos Scientific Laboratory, Los Alamos, New Mexico
Mound Laboratory, Miamisburg, Ohio
National Accelerator Laboratory, Batavia, Illinois
Oak Ridge National Laboratory, Oak Ridge, Tennessee
Puerto Rico Nuclear Center, San Juan, Puerto Rico
Sandia Laboratories, Albuquerque, New Mexico
Savannah River Laboratory, Aiken, South Carolina
Stanford Linear Accelerator Center, Stanford, California

Table V.

UNIVERSITY ASSOCIATIONS

Argonne Universities Association (AUA)

Assistant to the President for Educational Affairs
Argonne Universities Association
9700 S Cass Avenue
Argonne, Illinois 60439

Arizona, University of
Carnegie-Mellon University
Case Western Reserve University
Chicago, University of
Cincinnati, University of
Illinois Institute of Technology
Illinois, University of
Indiana University
Iowa State University
Iowa, University of
Kansas State University
Kansas, University of
Loyola University at Chicago
Marquette University
Michigan State University
Michigan, University of
Minnesota, University of
Missouri, University of, at Columbia
Missouri, University of, at Rolla
Northwestern University
Notre Dame, University of
Ohio State University
Ohio University
Pennsylvania State University
Purdue University
St. Louis University
Southern Illinois University
Texas, University of, at Austin
Washington University at St. Louis
Wayne State University
Wisconsin, University of

Associated Universities, Inc. (AUI)

Office of the President
1717 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Columbia University
Cornell University
Harvard University
The Johns Hopkins University
Massachusetts Institute of Technology
Pennsylvania, University of
Princeton University
Rochester, University of
Yale University

Associated Western Universities (AWU)

Executive Director
Associated Western Universities
136 East South Temple
Suite 1005
Salt Lake City, Utah 84111

Arizona State University
Arizona, University of
Brigham Young University
California Polytechnic State University
California State University at Chico
California State University at Hayward
California State University at Los Angeles
California State University at Northridge
California State University at San Diego
California State University at San Jose
California, University of, at Davis
California, University of, at Los Angeles
California, University of, at Riverside
California, University of, at Santa Barbara
Colorado State University
Colorado, University of
Denver, University of
Houston, University of
Idaho State University
Idaho, University of
Montana State University
Montana, University of
Nevada, University of, at Las Vegas
Nevada, University of, at Reno
New Mexico State University
New Mexico, University of
Rice University
South Dakota State University
South Dakota, University of
Texas A & M University
Texas, University of, at El Paso
Utah State University
Utah, University of
Virginia, University of
Wyoming, University of

Oak Ridge Associated Universities (ORAU)

Executive Director
Oak Ridge Associated Universities
P. O. Box 117
Oak Ridge, Tennessee 37830

Alabama, University of, at Birmingham
Alabama, University of
Arkansas, University of

Oak Ridge Associated Universities (continued)

Auburn University
Catholic University of America
Clemson University
Duke University
Emory University
Fisk University
Florida State University
Florida, University of
Georgia Institute of Technology
Georgia, University of
Kentucky, University of
Louisiana State University at Baton Rouge
Louisville, University of
Maryland, University of
Meharry Medical College
Memphis State University
Miami, University of
Mississippi State University
Mississippi, University of
North Carolina State University
North Carolina, University of
North Texas State University
Oklahoma, University of
Puerto Rico, University of
Rice University
South Carolina, University of
Southern Methodist University
Tennessee, University of, at Knoxville
Texas A & M University
Texas Christian University
Texas, University of, at Austin
Texas Woman's University
Tulane University
Tuskegee Institute
Vanderbilt University
Virginia Polytechnic Institute and State University
Virginia, University of
West Virginia University
William and Mary, College of

University Isotope Separator at Oak Ridge (UNISOR)

P. O. Box 117
Oak Ridge, Tennessee 37830

Alabama, University of, at Birmingham
Emory University
Furman University
Georgia Institute of Technology
Kentucky, University of
Louisiana State University at Baton Rouge
Massachusetts, University of
South Carolina, University of
Tennessee Technological University
Tennessee, University of, at Knoxville
Vanderbilt University
Virginia Polytechnic Institute and State University

EDUCATIONAL ASSISTANCE ACTIVITIES

Traineeships

To help meet professional manpower requirements and assist in maintaining centers of graduate education throughout the United States, a Traineeship Program is conducted for graduate study in the areas of nuclear engineering, radiation protection, and environmental science and engineering. Institutions which offer the master's and/or doctor's degree with a major in one of the above areas is eligible to participate in the program. Funds are provided, through a contract, to each selected university for an education allowance, in lieu of tuition and fees, and a stipend for each authorized traineeship. Trainees are selected by the university holding a traineeship contract. All inquiries regarding entrance requirements and application should be directed to the participating university. Lists of the participating institutions are available from the Energy Research and Development Administration, Oak Ridge Operations Office, Research and Technical Support Division, Oak Ridge, Tennessee 37830 or the Division of Biomedical and Environmental Research, Energy Research and Development Administration, Room E-201, Washington, D.C. 20545.

Special Faculty and Student Research Participation (University–ERDA Laboratory Cooperative Program)

This activity is designed to increase the interactions and flow of information between universities and ERDA laboratories, to familiarize academic scientists with nuclear sciences and techniques, and to stimulate transfer of knowledge from ERDA laboratories to the academic community for incorporation into their education and training curricula. Graduate and undergraduate students as well as faculty members are assigned to appropriate laboratories to receive instruction and research exposure in advanced science and technology, using unique equipment and instrumentation unavailable on their campuses.

Appointments to ERDA laboratories are available to college and university faculty members for periods ranging from one month to as much as 12 months.

Training opportunities are also available to graduate and undergraduate students, usually during the summer months. A student is generally assigned to work with an experienced researcher in a major research project. In addition, special honors programs enable selected science students to spend an academic semester at an ERDA laboratory.

Opportunities are provided to qualified graduate students who have completed their graduate course curricula for an advanced degree to complete their dissertation or thesis research. Under competent supervision, but guided primarily by his faculty adviser, the student is permitted to use ERDA laboratories for research work acceptable to his university as a doctoral dissertation or master's thesis.

Inquiries concerning these Laboratory Cooperative Programs should be directed to one or more of the following organizations.

Director
Ames Laboratory
Iowa State University
Ames, Iowa 50010

Associate Director
Center for Educational Affairs
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

Assistant Director for Scientific Personnel
Brookhaven National Laboratory
Upton, New York 11973

Executive Director
Associated Western Universities
136 East South Temple, Suite 1005
Salt Lake City, Utah 84111

Director
Northwest College and University
Association for Science
100 Sprout Road
Richland, Washington 99352

Executive Director
Oak Ridge Associated Universities
P. O. Box 117
Oak Ridge, Tennessee 37830

Loans and Grants of Materials; Reactor Assistance; and Reactor Sharing

ERDA lends certain nuclear materials for use in the nuclear science and engineering instructional programs of institutions of higher learning. Typical materials include heavy water, natural uranium, graphite, and californium-252. ERDA may also loan special nuclear materials (examples: enriched uranium and plutonium) having sales price of over $5,000 and may grant special nuclear materials with an ERDA sales price of $5,000 or less. For those instructional programs currently making use of special nuclear materials having a value greater than $5,000, ERDA will continue to provide these materials without charge. Certain necessary restrictions, limitations, and requirements are imposed on these loans and grants.

ERDA can provide funds to educational institutions for the fabrication of reactor fuel elements and the shipment of spent fuel elements to reprocessing sites. Charges for the reprocessing of spent fuel elements are waived through this program.

Arrangements can be made for colleges and universities not having reactors to make use of such facilities, located at universities in their vicinity. Many institutions have intermittent needs for sources of neutrons which neighboring university reactors participating in this program can supply.

Inquiries concerning these programs should be referred to the Assistant Director for Nuclear Sciences of the Division of Physical Research, Energy Research and Development Administration Headquarters, Washington, D.C. 20545.

Faculty Training

Workshops, short courses and institutes of one to six weeks' duration are conducted to give college and high school science teachers sufficient background and understanding of the energy problem, resource availability and environmental assessment to allow them to develop study units and other training materials for classroom use.

These programs are conducted at selected universities and ERDA laboratories. Institutions interested in hosting such a program may write the Division of Biomedical and Environmental Research, ERDA Headquarters, for guidance information. Application for attendance is made to the program director at the host university.