

Cornell University

ANNOUNCEMENTS

Graduate School of Nutrition



1966-67



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1966-67

The Graduate School of Nutrition, a unit of Cornell University, is supported in part by state appropriations through the State University of New York

Academic Calendar

	1966-67	1967-68
Freshman Orientation	S, Sept. 17	S, Sept. 16
Registration, new students	M, Sept. 19	M, Sept. 18
Registration, old students	T, Sept. 20	T, Sept. 19
Instruction begins, 1 p.m.	W, Sept. 21	W, Sept. 20
Midterm grades due	W, Nov. 9	W, Nov. 8
Thanksgiving recess:		
Instruction suspended, 12:50 p.m.	W, Nov. 23	W, Nov. 22
Instruction resumed, 8 a.m.	M, Nov. 28	M, Nov. 27
Christmas recess:		
Instruction suspended, 10 p.m.	W, Dec. 21	W, Dec. 20
Instruction resumed, 8 a.m.	Th, Jan. 5	Th, Jan. 4
First-term instruction ends	S, Jan. 21	S, Jan. 20
Registration, old students	M, Jan. 23	M, Jan. 22
Examinations begin	T, Jan. 24	T, Jan. 23
Examinations end	W, Feb. 1	W, Jan. 31
Midyear recess	Th, Feb. 2	Th, Feb. 1
Midyear recess	F, Feb. 3	F, Feb. 2
Registration, new students	S, Feb. 4	S, Feb. 3
Second-term instruction begins, 8 a.m.	M, Feb. 6	M, Feb. 5
Midterm grades due	S, Mar. 25	S, Mar. 23
Spring recess:		
Instruction suspended, 12:50 p.m.	S, Mar. 25	S, Mar. 23
Instruction resumed, 8 a.m.	M, Apr. 3	M, Apr. 1
Second-term instruction ends, 12:50 p.m.	S, May 27	S, May 25
Final examinations begin	M, May 29	M, May 27
Final examinations end	T, June 6	T, June 4
Commencement Day	M, June 12	M, June 10

The dates shown in the Academic Calendar are tentative.

CORNELL UNIVERSITY ANNOUNCEMENTS

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GRADUATE SCHOOL OF NUTRITION

OFFICERS OF ADMINISTRATION

Perkins, James A., A.B., Ph.D., President of the University
Corson, Dale R., Ph.D., Provost of the University
Sproull, Robert L., Ph.D., Vice President for Academic Affairs of the University
Barnes, Richard H., Ph.D., Dean of the School
Young, Charlotte M., Ph.D., Secretary of the School

FACULTY

The titles and departments (or sections) of primary affiliation of faculty members are indicated.

Baker, Robert C., Ph.D., Professor, Poultry Husbandry
Barnes, Richard H., Ph.D., Professor, Graduate School of Nutrition
Buck, Paul A., Ph.D., Associate Professor, Dairy and Food Science
Call, David L., Ph.D., Associate Professor, H. E. Babcock Professorship of Food Economics, Graduate School of Nutrition
Comar, Cyril L., Ph.D., Professor, Physical Biology
Daniel, Louise J., Ph.D., Professor, Biochemistry
Darling, C. Douglas, M.D., Professor, University Health Services
Donald, Elizabeth A., Ph.D., Assistant Professor, Food and Nutrition
Finn, Robert K., Ph.D., Professor, Chemical Engineering
Gaylor, James L., Ph.D., Associate Professor, Graduate School of Nutrition
Hackler, L. Ross, Ph.D., Assistant Professor, Food Science and Technology, Geneva
Hand, David B., Ph.D., Professor, Food Science and Technology, Geneva
Hartman, John D., Ph.D., Professor, Vegetable Crops
Hester, E. Elizabeth, Ph.D., Professor, Food and Nutrition
Holley, Robert W., Ph.D., Professor, Biochemistry
Ilogue, Douglas E., Ph.D., Associate Professor, Animal Husbandry
Isenberg, F. M. R., Ph.D., Professor, Vegetable Crops
Krook, Lennart P., D.V.M., Ph.D., Professor, Pathology
Kuta, Edwin J., Ph.D., Assistant Professor, Food and Nutrition
Leach, Roland M., Ph.D., Assistant Professor, Poultry Husbandry
Lee, Frank A., Ph.D., Associate Professor, Food Science and Technology, Geneva
Lengemann, Frederick W., Ph.D., Professor, Physical Biology
Longrée, Karla, Ph.D., Professor, Institution Management
Loosli, John K., Ph.D., Professor, Animal Husbandry
Lutwak, Leo, Ph.D., M.D., James Jamison Professor of Clinical Nutrition, Graduate School of Nutrition
Mattick, Leonard R., Ph.D., Associate Professor, Food Science and Technology, Geneva

6 FACULTY AND STAFF

- Maynard, Leonard A., Ph.D., Professor Emeritus, Graduate School of Nutrition
McCormick, Donald B., Ph.D., Associate Professor, Graduate School of Nutrition
Merrill, William G., Ph.D., Associate Professor, Animal Husbandry
Mondy, Nell, Ph.D., Associate Professor, Food and Nutrition
Moore, Norman S., M.D., Professor, University Health Services
Morrison, Mary A., Ph.D., Professor, Food and Nutrition
Moyer, James C., Ph.D., Professor, Food Science and Technology, Geneva
Nelson, Walter L., Ph.D., Professor, Biochemistry
Nesheim, Malden C., Ph.D., Associate Professor, Poultry Husbandry
Newman, Katherine J., Ph.D., Associate Professor, Food and Nutrition
Personius, Catherine J., Ph.D., Professor, Food and Nutrition
Pond, Wilson, Ph.D., Associate Professor, Animal Husbandry
Reid, John Thomas, Ph.D., Professor, Animal Husbandry
Rivers, Jerry Margaret, Ph.D., Associate Professor, Food and Nutrition
Robinson, Willard B., Ph.D., Professor, Food Science and Technology, Geneva
Roe, Daphne Anderson, M.D., Assistant Professor, Graduate School of Nutrition
Scott, Milton L., Ph.D., Professor, Poultry Husbandry
Seeley, Harry W., Jr., Ph.D., Professor, Microbiology
Shallenberger, Robert S., Ph.D., Associate Professor, Food Science and Technology, Geneva
Smith, Ora, Ph.D., Professor, Vegetable Crops
Smith, Sedgwick E., Ph.D., Professor, Animal Husbandry
Smock, Robert M., Ph.D., Professor, Pomology
Turk, Kenneth L., Ph.D., Professor, Animal Husbandry
VanBuren, Jerome P., Ph.D., Associate Professor, Food Science and Technology, Geneva
van Veen, André G., Ph.D., Professor, Graduate School of Nutrition
Visek, Willard J., Ph.D., M.D., Professor, Animal Husbandry
Warner, Richard G., Ph.D., Professor, Animal Husbandry
Wasserman, Robert H., Ph.D., Professor, Physical Biology
Wellington, George H., Ph.D., Professor, Animal Husbandry
Williams, Harold H., Ph.D., Professor, Biochemistry
Wright, Lemuel D., Ph.D., Professor, Graduate School of Nutrition
Young, Charlotte M., Ph.D., Professor, Graduate School of Nutrition
Young, Robert J., Ph.D., Professor, Poultry Husbandry

STAFF

- Anderson, Annette Y., Research Technician
Armitage, Shirley O., L.P.N., Research Nurse
Belkin, Barbara, B.S., Research Technician
Berresford, Kathleen, M.S., Editor of School Publications
Bredderman, Susie, M.S., Research Dietitian
Colbert, Ellen S., R.N., Research Nurse
Delwiche, Constance N., M.F.S., Research Technician

Fiala, Grace F., A.B., Research Technician
Gilbert, Kenneth E., B.S., Administrative Assistant
Gilbert, Marjorie, L.P.N., Research Nurse
Graham, Donald C. W., M.S., Research Technician
Johnson, Cathleen M., B.S., Research Technician
Kwong, Eva H., Ph.D., Research Associate
Manno, Donald, Research Technician
MacAllister, Beverly, R.N., Research Nurse
Miller, Pearl S., M.S., Research Technician
Moore, A. Ulric, Ph.D., Research Associate
Phillips, Anne L., L.P.N., Research Nurse
Roth, Margaret K., R.N., Research Nurse
Ruis, Helmut, Ph.D., Research Associate
Sadowski, Joseph P., Research Technician
Sambhavaphol, Poonsakdi, Ph.D., M.D., Research Associate
Sanchez, Ann M., M.N.S., Research Technician
Schultz, A. Louise, R.N., Research Nurse
Smith, Elizabeth W., R.N., Research Nurse
Swan, Patricia L., B.S., Research Technician
Weston, Marilyn O., B.S., Research Technician



Cornell University

GRADUATE SCHOOL OF NUTRITION

The Graduate School of Nutrition was founded in 1941 as a center for graduate training and research in nutrition at Cornell. The only school of its kind, it offers a program of instruction that prepares its graduates for professional work or more advanced training in nutrition and the sciences related to nutrition.

At one time, the study of nutrition was limited to training in biochemistry, physiology, and biology, and the relationship of these sciences to health and disease. Today nutritional science must also be related to such disciplines as the behavioral sciences, food technology, economics, and education. And the Graduate School of Nutrition provides advanced study in such an integrated program that leads to the degree, Master of Nutritional Science (M.N.S.).

For students interested in the biological and physical sciences, a rapidly developing field is that of nutritional biochemistry. Today the science of nutrition cannot exist separately from fundamental biochemistry: the two areas are closely allied, and the science of nutrition is generally considered a branch of biochemistry. One function of modern nutrition is the development of biochemical knowledge that can be applied to the intact organism. The Graduate School of Nutrition has aligned its research programs with heavy emphasis on fundamental biochemistry in areas ranging from the study of enzymological phenomena at a subcellular level to the application of biochemistry in experimental animals and in man, both normal and diseased.

The strength of the School lies in its faculty of outstanding scientists, its predetermined program of basic sciences, its high standards for admission and graduation, and its concentration on a professional area of science. Because the School is relatively small, intangible advantages accrue through the students' opportunities for close association with the professors and their research, and with other students having similar and yet diverse interests.

The fundamental nature of the School's program makes it possible to offer specialized graduate study in nutrition for students who have

had no previous course work in the subject—contrary to the requirements in most other such programs. And for students who are interested in the biological sciences, but who are not certain of the field of graduate work they wish to enter, the School's program fills a special need. Because nutritional science is closely related to many areas of basic biology, the Master of Nutritional Science degree program has proved particularly valuable in helping students decide upon a field of graduate study for the Ph.D. degree. The background core of basic sciences may be used toward completion of the Ph.D. degree in such fields as biochemistry, physiology, and food technology, as well as nutrition—both human and animal. A large proportion of the School's graduates continue advanced study for the Ph.D. degree.

The caliber of positions held by graduates of the School reflects the quality of training they receive. Many are engaged in significant laboratory research involving experimental biochemistry, as well as animal and human studies. Others hold responsible positions in government, private and international agencies, working with the nutrition and food technology problems of large populations. Many graduates are on the faculties of academic institutions throughout the world.

For those students who are more interested in a career in food science and technology, the School offers specialized training that leads to the degree, Master of Food Science (M.F.S.). This program, also based on a prescribed core of basic sciences, prepares students for careers in government and industrial laboratories and in feed companies, and for positions involving food research and food production, both in this country and in the developing countries of the world.

THE FACULTY

Because the School serves as an integrating center for graduate academic and research programs in nutrition at Cornell, the faculty of a number of departments and divisions of the University are drawn upon to provide counseling and instruction in the School's program. Many of these faculty members are appointed jointly in the Graduate School of Nutrition.

In addition, the School has its own core faculty with offices and laboratories in Savage Hall or in its Clinical Nutrition Unit in Sage Hospital. Among these professors are biochemists, working in rather fundamental areas of nutritional biochemistry; clinicians working actively in nutritional research programs; experimental nutritionists using animals to replicate some of the more serious nutritional problems of man; public health nutritionists, training students for careers in community nutrition; and experts in international nutrition, conducting research and training students in those areas of nutrition which are, to some extent, unique to the developing countries of the world.

The complete faculty of the School also includes animal nutritionists, food economists, food scientists, and specialists in related areas of agriculture and home economics.

Although frequently members of the core faculty serve as advisers in

planning a student's curriculum and directing his special research problem, an adviser may be selected from among those on the complete faculty.

TRAINING IN SPECIALIZED FIELDS

NUTRITIONAL SCIENCE. The basic training for the M.N.S. degree emphasizes the physical and biological sciences and the basic principles of nutrition. Through appropriate electives, students learn to apply these principles in either human or animal nutrition. Facilities for research include biochemical, microbiological, and physiological laboratories, experimental animal quarters, a diet table for experimental work in human nutrition, and a metabolic unit in Cornell's Sage Hospital for the study of nutrition in relation to disease. Depending upon a student's interests, he has the opportunity to select the particular type of laboratory training in which he wishes to become proficient. Experience in such a laboratory may then become the basis of his special problem report.

One of the strengths of the School not found in many other institutions of nutrition is that training is provided in a number of specializations. Among these are nutritional biochemistry, experimental and agricultural animal nutrition, clinical nutrition, human nutrition, public health nutrition, and international nutrition. Special emphasis is achieved primarily through the choice of electives and the area selected for the special problem. As two of the areas, public health nutrition and international nutrition, involve special arrangements for field opportunity, they will be mentioned in more detail.

Public Health Nutrition. Special opportunities are provided for students of appropriate background who wish to prepare themselves for work as community nutritionists with health and welfare agencies. Here, the approved electives will include certain phases of social science, the elements of public health, clinical and public health nutrition, and appropriate informational service techniques. Opportunities for supervised experiences with community and health agencies are available for selected students. Students accepted for training in this area must plan financially for three to four weeks of residence away from Cornell to cover the field experience. Two weeks of this will be in the fall just prior to the academic year; the third and possible fourth week may be either during the spring recess or immediately following final examinations. In addition, suitable students are expected to spend a two months' period in the summer in "in-service" training in nutrition as applied to the community and to public health. Help will be given in making the necessary contacts. These opportunities will provide assignments which can be used as the basis for meeting the requirement for a report on an individual problem.

International Nutrition. To meet the need for professionally trained men and women in government and international agencies, the School offers a program in international nutrition. Designed especially for American students, it is open also to others interested in the practical

application of nutrition and food science to the problems of developing countries. The program includes courses in the sciences basic to nutrition that are extensive enough to equip students for a variety of careers in nutrition. Emphasis in electives is then placed on specialized study in problems and programs in international nutrition and related fields such as agriculture, public health, extension teaching, sociology, and anthropology. When the opportunity exists, field experience will be given. Training will also be integrated with agricultural and public health programs whenever possible. Several traineeships and assistantships are available to qualified students. For further details, request the descriptive leaflet, *Program in International Nutrition*, from the School.

FOOD SCIENCE. Growing emphasis on food — its availability, quality, processing, packaging, as well as its nutritive value — indicates a period of expanding opportunities for those trained in food science. The Graduate School of Nutrition offers programs for M.F.S. candidates which lead to careers in food production, research, quality control, technical sales, teaching, and government and international nutrition work.

Since all techniques for food processing and handling must be based on a thorough knowledge of food characteristics, the Graduate School of Nutrition prescribes an M.F.S. program emphasizing the sciences fundamental to the field, namely, chemistry, biochemistry, and bacteriology. The student who masters these sciences may easily learn the details of special food techniques on the job. His basic academic training therefore does not include specialized technology courses in food processing, packaging, and the like.

Work on the special problem may be carried on either at the Ithaca campus or at the New York State Agricultural Experiment Station at Geneva, New York. Staff members advise students and acquaint them with the several research projects under way, including studies of food spoilage, flavor, composition, preservation, fermentation, and irradiation effects.

OPPORTUNITIES IN NUTRITIONAL AND FOOD SCIENCE

Just as many fields of science are made up of a complex of sciences, so too is the field of nutrition. Nutrition is a rapidly expanding multidisciplinary area of science that brings together those fundamental principles of the physical and biological sciences relating to the reproduction, growth, and health of living organisms. When the study is applied specifically to man, additional principles from the social and behavioral sciences are drawn upon.

Research in human and animal nutrition explores the minute and intricate chemical and physiological processes that are used by the body to transform food into life. Since the earliest days of scientific curiosity about food, a mass of knowledge has been accumulated about nutrition. But rapidly developing research methods and new tools of investigation

have given impetus to the search for answers to the many problems remaining. Among these problems are the possible nutrition-related causes of physical abnormalities, inborn errors of metabolism, hypertension, heart disease, dental caries, arthritis and osteoporosis, mental retardation, and many others.

A career related to nutritional and metabolic studies, then, could mean carrying on research in a biochemical laboratory, in a clinical or ambulatory metabolic setting, or working with experimental animals — in universities, research foundations, or government laboratories.

With the acquisition of fundamental principles and their application to the improvement of health, comes the need for putting this knowledge to work for the benefit of humanity. Here again, research is often required to learn what groups would benefit most from a change in food habits, and how best to bring about this change in relation to the various psychological, social, and economic influences operating in a particular culture.

Studies are also needed to determine what foods are available to meet nutritional needs, whether they are produced and processed for optimal preservation of their nutrients, whether their palatability can be improved, or whether new, more acceptable foods need to be developed. Both nutritional and food scientists study these problems.

Working in the applied field, such scientists may teach in universities, medical, dental, or veterinary colleges, or other postgraduate schools, or in hospitals and clinics not associated with colleges. In the field of public health, they may work directly with people, or as consultants in community and government agencies both in this country and abroad. Many opportunities are available in private agencies, and in public agencies at all levels of government, as well as in bilateral and international organizations such as FAO, WHO, UNICEF, AID, and Food for Peace.

CURRICULUM AND DEGREES

The Graduate School of Nutrition offers a curriculum providing for specialization in either nutritional science or food science. The student receives a firm foundation in the sciences basic to his field, along with practical preparation, through carefully chosen electives, for work in his professional career. In some instances, "in-service" training is also provided. The candidate for a degree also prepares a report of thesis caliber, representing 6 to 10 semester hours' credit and based on his original research on a special problem. Each student is assigned a faculty adviser in whose area of specialization his own interests lie. The adviser plans the curriculum and directs the student's special research problem.

The degrees of Master of Nutritional Science and Master of Food Science are awarded by the Cornell University Graduate School after satisfactory completion of courses considered basic to an understanding of nutritional or food science. These degrees represent a defined accomplishment in the area of professional interest.

The curriculum completed for the M.N.S. and M.F.S. degrees also establishes an excellent background for further advanced study. Students who have obtained these degrees frequently continue studies leading to the Ph.D. degree in such fields as biochemistry, physiology, food science and technology, and animal or human nutrition.

ADMISSION

To be admitted to the School the applicant must hold a baccalaureate degree from a college or university of recognized standing or have completed work equivalent to that required for such a degree. He must have a definite professional interest in the field of either nutritional science or food science.

Academic Admission Requirements

To qualify for admission, an applicant must have completed, with a superior record, courses in the following subjects with the approximate number of semester hours as stated.

PHYSICAL SCIENCES. A total of 20 hours divided among chemistry, physics, and mathematics. Courses in quantitative chemistry and organic chemistry are prerequisites to courses required for graduation. If they are not offered for entrance, they must be taken following admission. Students who enter without college training in physics are required to take an elementary course in that subject before graduation. Credits

A research conference where a molecular model is used to illustrate the compound being investigated.



for beginning courses in physics and chemistry, including organic and quantitative analysis, cannot be counted toward the credits required for graduation.

BIOLOGICAL SCIENCES. A total of 12 hours in such courses as biology, botany, zoology, bacteriology, and physiology for candidates for the M.N.S. degree. Courses in animal or human nutrition up to three hours may be counted in the biological sciences. Elementary courses in bacteriology or physiology cannot be counted toward graduation. For candidates for the M.F.S. degree, eight hours are required in the biological sciences. Elementary courses in bacteriology cannot be counted toward graduation. However, an elementary course in bacteriology is prerequisite for advanced courses in bacteriology.

SOCIAL STUDIES. A total of nine hours in such subjects as economics, government, education, psychology, sociology, anthropology, and history.

OTHER COURSES. The applicant's record must show evidence that he has satisfactorily completed other courses prerequisite to those required by a candidate for a degree. An applicant who cannot meet in full the specific course requirements may be admitted if the faculty of the School so recommends, with the understanding that the deficiencies must be made up before graduation.

Non-Degree Candidates

In some instances students may be admitted as non-degree candidates (special students) to take course work and special training in nutrition programs. Normally such students should have completed undergraduate study at the Bachelor's degree level although, with appropriate justification, this requirement may be waived. Special students are not subject to the standard requirements for admission to the Graduate School of Nutrition, nor to the requirements for course work to be completed for graduate degrees.

University Requirements and Health Requirements

Applicants must meet the general requirements for admission to the Graduate School as set forth in the *Announcement of General Information* and the *Announcement of the Graduate School*.

The following health requirements for entering graduate students have been adopted by the Cornell Board of Trustees. Failure to fulfill these requirements will result in loss of the privilege of registering the following term. The responsibility for fulfilling these requirements rests with the student.

IMMUNIZATION. A satisfactory certificate of immunization against small-pox, on the form supplied by the University, must be submitted before

registration. It will be accepted as satisfactory only if it certifies that within the last three years a successful vaccination has been performed. If this requirement cannot be fulfilled by the student's home physician, opportunity for immunization will be offered by the Cornell medical staff during the student's first semester, with the cost to be borne by the student. If a student has been absent from the University for more than three years, immunity will be considered to have lapsed, and a certificate of revaccination must be submitted.

HEALTH HISTORIES. Students accepted for admission will be required to submit health histories on forms supplied by the University.

X-RAY. Every student is required to have a chest X-ray. Opportunity is given to satisfy this requirement during the student's first week on campus. The cost of the X-ray examination is included in the General Fee.

When a student who has been away from the University for more than a year wishes to re-enter, he must, at his own expense, once more fulfill the chest X-ray requirement and also submit a new health history.

Applications and Registration

Applicants for admission should address their inquiries to the Office of the Graduate School, Sage Graduate Center, Cornell University, Ithaca, New York 14850. The form the applicant will receive is one which is used in all areas of graduate study and does not apply in all of its details to Graduate School of Nutrition applicants. In completing the form, applicants should indicate an interest in either *nutritional science for the M.N.S. degree* or *in food science for the M.F.S. degree in the Graduate School of Nutrition*. In neither program is it necessary to indicate a minor area of study. No application will be acted upon until all credentials enumerated in the application form have been filed.

All students admitted to the Graduate School of Nutrition must register through the Graduate School Office, Sage Graduate Center, at the beginning of each term or session.

REQUIREMENTS FOR GRADUATION

For graduation a student must have completed at least two units of residence and at least 36 semester hours of specified and approved courses of which not more than 10 can be in research (Graduate School of Nutrition 199). In the event that certain required courses have been completed satisfactorily by the student prior to his admission to the Graduate School, substitutions will be made with the approval of his faculty adviser.

Certain elective courses may be required as deemed appropriate by the adviser and the faculty of the Graduate School of Nutrition to round out the student's professional training in nutritional science or food science. The student must prepare a written report on an approved

problem that may or may not require laboratory research, and must pass a final examination. The curriculum differs in accordance with the field in which the student wishes to specialize, as follows:

Nutritional Science

The specialized training in the field of nutritional science, leading to the degree of Master of Nutritional Science, emphasizes the basic scientific knowledge and techniques of nutrition. The completion of the following curriculum is required:

	<i>Hours</i>		<i>Hours</i>
Biochemistry	7	Statistics	3
Principles of nutrition	3	Seminars	1
Laboratory work in nutrition	3	Advanced courses in human or	
Advanced physiology	6	animal nutrition	4
Food economics	3	Special problem	6 to 10

Faculty advising students for the M.N.S. degree include Professors R. H. Barnes, D. L. Call, C. L. Comar, Louise J. Daniel, Elizabeth A. Donald, J. L. Gaylor, L. R. Hackler, R. W. Holley, D. E. Hogue, L. P. Krook, R. M. Leach, F. W. Lengemann, J. K. Loosli, L. Lutwak, D. B. McCormick, W. G. Merrill, Mary A. Morrison, W. L. Nelson, M. C. Nesheim, Katherine J. Newman, W. G. Pond, J. T. Reid, Jerry M. Rivers, Daphne A. Roe, M. L. Scott, S. E. Smith, K. L. Turk, A. G. van Veen, W. J. Visek, R. G. Warner, R. H. Wasserman, H. H. Williams, L. D. Wright, Charlotte M. Young, and R. J. Young.

COURSES APPROVED FOR ADVANCED NUTRITION CREDIT

		<i>Hours</i>
Animal Husbandry 501	Minerals and Vitamins	2
Animal Husbandry 502	Lipids and Carbohydrates	2
Animal Husbandry 503	Nutritional Energetics	2
Animal Husbandry 510	Special Topics in Animal Nutrition	1 ^a
Biological Sciences 530	Biochemistry of the Vitamins	2
Biological Sciences 537	Advanced Biochemistry	1 or 2 ^a
Biological Sciences 538	Advanced Biochemistry	1 or 2 ^a
Food and Nutrition 324	Nutrition	3 ^b
Food and Nutrition 330	Nutrition and Disease	3
Food and Nutrition 402	Readings in Nutrition	2
Food and Nutrition 424	Advanced Nutrition	2
Food and Nutrition 440	Nutrition and Growth	2
Food and Nutrition 501	Proteins and Amino Acids	2
Poultry Husbandry 510	Advanced Poultry Nutrition	2
School of Nutrition 100	Problems and Programs in	
	International Nutrition	4
School of Nutrition 160	Nutritional Biochemistry	3
School of Nutrition 381	Field Observation and Experience	
	in Community Nutrition	1

School of Nutrition 382	Field Observation and Experience in Community Nutrition	1
School of Nutrition 392	Clinical and Public Health Nutrition	3
Veterinary Pathology 931	Pathology of Nutritional Diseases	3

^a Depending upon the topic.^b If equivalent not previously taken.

Food Science

The specialized training in this field, leading to the degree of Master of Food Science, emphasizes the sciences involved in food processing and utilization. The completion of the following curriculum is required:

	<i>Hours</i>		<i>Hours</i>
Biochemistry	7	Statistics	3
Advanced courses in bacteriology	6	Nutrition	3
Approved courses in food science	11	Seminars	1
		Special problem	6 to 10

In addition, the requirements include such approved electives as the faculty adviser and the faculty of the School may deem appropriate and necessary to round out the student's training in the field of food science.

Faculty advising students for the M.F.S. degree include Professors R. C. Baker, R. H. Barnes, P. A. Buck, D. L. Call, R. K. Finn, D. B. Hand, J. D. Hartman, Elizabeth E. Hester, F. M. R. Isenberg, E. J. Kuta, F. A. Lee, Karla Longr  e, L. R. Mattick, Nell Mondy, J. C. Moyer, W. L. Nelson, Catherine J. Personius, W. B. Robinson, H. W. Seeley, R. S. Shallenberger, O. Smith, R. M. Smock, J. P. VanBuren, A. G. van Veen, G. A. Wellington, and L. D. Wright.

COURSES APPROVED FOR ADVANCED FOOD SCIENCE CREDIT

		<i>Hours</i>
Biological Sciences 530	Biochemistry of the Vitamins	2
Dairy Science 232	Fluid Milk Processing and Quality Control	4
Dairy Science 340	Dairy and Food Engineering	4
Dairy Science 430	Food Products from Milk Fermentations	5
Dairy Science 433	Chemistry of Milk	2 ^a
Dairy Science 531	Analytical Methods	4
Food and Nutrition 316	Science of Food	3 or 4
Food and Nutrition 317	Science of Food, Laboratory	1
Food and Nutrition 318	Experimental Food Methods	2
Food and Nutrition 403	Special Problems for Graduate Students	^b

Food and Nutrition 404	Readings in Foods	2
Food Science 361	Principles of Food Technology	3 or 5
Food Science 362	Principles of Food Technology	3 or 5
Food Science 410	Food Biochemistry	3
School of Nutrition 100	Problems and Programs in International Nutrition	4
School of Nutrition 159	Food Economics	3
School of Nutrition 250	Seminar in World Problems of Food and Population	2
Pomology 201	Post-harvest Physiology, Handling and Storage of Fruits	3
Poultry Husbandry 450	Poultry Meat and Egg Technology	3
Vegetable Crops 222	Potato Production and Processing	3
Vegetable Crops 412	Handling and Marketing Vegetable Crops, Advanced Course	4

^a Depending upon the topic.

^b Credits as arranged.

Special Problem and Examinations

The work involved in the report on an individual problem required for both degrees may be carried out with the approval of the student's faculty adviser under the direction of any member of the faculty of the School whom the student may choose and who is willing to supervise it. The report must be approved by the supervising faculty member and the original copy submitted to the Office of the Dean of the Graduate School of Nutrition at least one week prior to the beginning of the final examination period. Directions concerning the form in which the report is to be presented may be obtained either from the student's faculty adviser or from the Office of the Dean of the Graduate School of Nutrition.

A final examination, either oral or written or both, is required for either degree. Examinations are conducted by a committee consisting of the faculty adviser plus one other member to be designated by the faculty of the Graduate School of Nutrition or its delegated agent.

Residence Requirements

To receive a degree from the School, a student must complete at least two terms of residence after receiving the Bachelor's degree from Cornell or elsewhere. (In most instances, students need more than two terms of residence in which to complete all degree requirements.)

SUMMER SESSION STUDY. A student registered in the School may receive credit for work done in the University Summer Session if his program is approved in advance by his faculty adviser. To receive this credit he must also be registered in the Summer Session. A student who has been registered in the School for one term after receiving his Bachelor's degree may, with the approval of his faculty adviser, register

for a minimum of four and a maximum of twelve weeks for work in the summer on his individual problem under personal direction of a member of the faculty of the School and thus earn residence credit. The student can thus make use of the summer period to meet, in whole or in part, the requirements of six to ten hours granted upon the completion of his report on an approved problem.

TUITION AND FEES

A registration deposit of \$28 must be made by every applicant accepted for admission unless the candidate has previously matriculated as a student at Cornell University. A check or money order payable to Cornell University should be remitted to the Graduate School, Sage Graduate Center, upon notification of acceptance. This deposit pays the matriculation fee, chest X-ray fee, and examination book charge and covers certain expenses incident to graduation if the student receives a degree. The deposit will not be refunded to any candidate who withdraws his application after May 22, or after 20 days following his admission approval.

Limited refunds of tuition and fixed fees will be made to students who withdraw from the University prior to the completion of a term, for reasons accepted as satisfactory. For students who do not complete a term, tuition and other fees will be charged at the rate of 10 per cent for each week, or fraction of a week, from the first day of registration to the date of withdrawal as certified by the School; if, however, withdrawal is made within six days of the date of registration, no charge is assessed. The registration deposit will not be refunded.

The tuition for students registered in the Graduate School of Nutrition is \$200 a term payable at the beginning of each term. Certain assistantships carry a waiver of tuition.

A General Fee of \$237.50 a term payable at the beginning of each term is required of each registrant of the Graduate School of Nutrition whether he is receiving full residence credit or not. The General Fee contributes toward the services supplied by the libraries, Clinic and Sage Hospital, and the student union in Willard Straight Hall, and pays a portion of the extra cost of laboratory courses and general administration.

Students of the Graduate School of Nutrition who attend classes in the Summer Session must register both in the Graduate School and in the Summer Session and pay the tuition and other fees required by the Summer Session. No fee is required for Summer Research if a student was regularly registered in the Graduate School during the previous academic year.

A graduate student who returns to the University to present his thesis and to take the final examination for an advanced degree, all other work for that degree having been previously completed, must register as a "candidate for degree only" and pay a fee of \$35.

If it is necessary for a student to withdraw, he should make arrangements at the Graduate School office before leaving the campus.

Tuition or fees may be changed by the Board of Trustees at any time without previous notice.

ASSISTANTSHIPS AND TRAINEESHIPS

A number of assistantships and traineeships are available in the School's research programs, and any student admitted to the School may apply for this type of financial aid. The stipend is approximately \$3,000 for a twelve-month appointment; in some instances it is prorated on a nine-month basis. The appointments carry waiver of tuition, but the student must pay all fees required by the Graduate School. For September appointment, application should be made by March 1 to the Secretary, Graduate School of Nutrition, Savage Hall. Announcement of appointments will be made on or about April 1.

PUBLIC HEALTH TRAINEESHIPS FOR PUBLIC HEALTH PERSONNEL. Students interested in preparing for positions as public health nutritionists may apply for public health traineeship awards from the U.S. Public Health Service. Applicants may secure application forms and additional information from any of the Regional Medical Directors of the U.S. Public Health Service or from the Chief, Division of General Health Services, Bureau of State Services, Public Health Service, Department of Health, Education, and Welfare, Washington, D.C.

ADVISORY SERVICE FOR STUDENTS PREPARING AT CORNELL TO ENTER THE SCHOOL

Students in the Colleges of Agriculture, Arts and Sciences, or Home Economics at Cornell University, who prepare for admission to the Graduate School of Nutrition, may be advised during the period of preparation by members of the faculty of the School who are also members of the faculty of the college in which the students matriculate.

Undergraduates who are interested in nutrition and who are ma-

A technician uses special automated equipment for analysis of the hundreds of samples taken in metabolic balance studies at the Clinical Nutrition Unit.



triculating at Cornell University for the first time should state upon the application for admission that nutrition is the business or profession (field of work) which they expect to enter upon completion of their studies. This is necessary in order that appropriate faculty advisers may be assigned to them.

HEALTH SERVICES AND MEDICAL CARE

Health services and medical care for students are centered in two Cornell facilities: the Gannett Medical Clinic (out-patient department) and the Sage Hospital. Students are entitled to unlimited visits at the Clinic (appointments with individual doctors at the Clinic may be made, if desired, by calling or coming in person; an acutely ill student will be seen promptly whether he has an appointment or not). Students are also entitled to laboratory and X-ray examinations indicated for diagnosis and treatment, hospitalization in the Sage Hospital with medical care for a maximum of fourteen days each term, and emergency surgical care. The cost of these services is covered in the General Fee.

On a voluntary basis, insurance is available to supplement the services provided by the General Fee. For further details, including charges for special services, see the *Announcement of General Information*. If, in the opinion of the University authorities, the student's health makes it unwise for him to remain in the University, he may be required to withdraw.

HOUSING FOR GRADUATE STUDENTS

DORMITORY ACCOMMODATIONS. The University has established Sage Hall as a graduate residential center. Its dormitory facilities accommodate approximately 100 men in the north side of the building and 105 women in the south side. The Graduate Center, which is available for use by all graduate students and faculty, also contains a cafeteria seating 200, study rooms, and lounges. In addition, Cascadilla Hall has been newly remodeled to accommodate approximately 140 single graduate men.

Applications for dormitory accommodations may be made any time after January 1 for the coming academic year by writing the Department of Housing and Dining Services, 223 Day Hall.

FAMILY ACCOMMODATIONS. The University, through the Department of Housing and Dining Services, has three apartment developments for married students and their families. They are Cornell Quarters, Pleasant Grove Apartments, and Hasbrouck Apartments, with total housing for about 400 families. All apartments are unfurnished. For further information and application, write the Department of Housing and Dining Services, Room 223, Day Hall.

The Department of Housing and Dining Services also maintains a list of available rental housing in the Ithaca area. Information on housing currently available can be obtained only at the Off-Campus Housing Office, Room 223, Day Hall. Lists cannot be sent out because changes occur daily. Students desiring off-campus housing should come to Ithaca well in advance of the term opening to arrange for such accommodation.

DESCRIPTION OF COURSES

The following list of courses includes both those specified previously as required for the degrees offered and some of those from which the student may select electives, with the approval of his faculty adviser, in accordance with his specific field of interest.

The information in parentheses following the name of the course refers to the college and department or the division in which the course is given, and the course number. In registering for any of these courses, list the course number and the department or division immediately preceding it, rather than the name of the course. In some instances the time and place are not given in the descriptive material following the title of the course. To obtain this information the student should consult the specific departmental office or the individual Announcements issued by the colleges concerned.

Courses marked with an asterisk () are acceptable to meet the "advanced nutrition" credit requirement. Those marked with a dagger (†) are acceptable to meet the "advanced food science" credit requirement.*

NUTRITION

PRINCIPLES OF ANIMAL NUTRITION

(Agriculture; Animal Husbandry 410)

Fall. Credit three hours. Prerequisites, a course in human or veterinary physiology and a course in organic chemistry or biochemistry. Lectures, M W F 10. Morrison 342. Professor Loosli.

The chemistry and physiology of nutrition and the nutritive requirements for growth, reproduction, lactation, and other body functions.

LABORATORY WORK IN ANIMAL NUTRITION

(Agriculture; Animal Husbandry 411)

Spring. Credit three hours. Prerequisites, quantitative analysis and Animal Husbandry 410, or its equivalent, and permission of the instructor. M W F 2-4:30. Morrison 342 and 443. Professor Warner.

Each student engages in a series of short research projects with experimental animals, such as rats, dogs, and sheep. Both classical and modern techniques of animal experimentation are taught. The applications of biochemical methods to the solution of animal nutrition problems are included.

NUTRITION

(Home Economics; Food and Nutrition 324)

Spring. Credit three hours. Prerequisites, elementary college courses in nutrition, biochemistry, and human physiology. Discussion, T Th 8, Th 2-4. Van Rensselaer 339. Associate Professor Newman.*

Principles of nutrition as they relate to energy metabolism, proteins, fats, minerals, and vitamins. Use of professional literature to acquaint the student with considerations involved in the application of nutrition information to human nutrition problems, to illustrate methods used in studying nutrition, and to provide experience in interpretation of scientific reports.

MATERNAL AND CHILD NUTRITION

(Home Economics; Food and Nutrition 340)

Fall and spring. Credit two hours. Prerequisite, Food and Nutrition 103 or 192. May not be taken concurrently with or following Food and Nutrition 324. Majors with special interest in this subject may elect Food and Nutrition 340 as sophomores or request permission to register for Food and Nutrition 440 as seniors. Lecture and discussion. W F 8. Van Rensselaer 339. Associate Professor Newman.

Family nutrition with special emphasis upon the nutritional needs of the mother and child. Relation of nutrition to physical growth.

PROBLEMS AND PROGRAMS IN INTERNATIONAL NUTRITION

(School of Nutrition 100)

Fall. Credit four hours. Registration by permission. Lectures M W 11-12:30, F 11-12. Savage Hall. Professor van Veen.* †

To acquaint students with the planning of effective programs and policies in the fields of nutritional and food science with the purpose of improving nutrition conditions in developing countries, with proper emphasis on the role of agriculture and public health. Among topics considered are typical foods and diets in different parts of the world, assessment of food and nutrition conditions, protein-rich and other protective foods, food processing and preservation in developing countries, food standards, and food control.

[ADVANCED NUTRITION]

(Home Economics; Food and Nutrition 424)

Fall. Credit two hours. Prerequisite, Food and Nutrition 324 or equivalent. M W 10. Van Rensselaer 339. Professor Morrison.*

Recent advances in nutrition. Emphasis on human nutrition. Not offered in 1966.

READINGS IN NUTRITION

(Home Economics; Food and Nutrition 402)

Spring. Credit three hours. Prerequisite, Food and Nutrition 324 or equivalent. T Th 11-12:30. Van Rensselaer 301. Assistant Professor Snook.*

Critical review of literature on selected topics in the field of nutrition. Emphasis on human nutrition. Topics are changed each term so the course may be repeated for credit with permission of the instructor.

[NUTRITION AND GROWTH]

(Home Economics; Food and Nutrition 440)

Fall. Credit two hours. Prerequisite, Food and Nutrition 324 or equivalent. Signature of instructor required for undergraduate students. T Th 10. Van Rensselaer 301. Associate Professor Newman.*

Information on growth which is of particular interest to nutritionists. Survey of methods used in studying physical and chemical growth. Relation between nutrition and growth. Offered in fall term of even-numbered years. Not offered in 1966.

POULTRY NUTRITION

(Agriculture; Poultry Husbandry 310)

Spring. Credit three hours. Prerequisite, chemistry and physiology or permis-

sion of instructor. Not open to freshmen. Lectures, M W F 8. Rice 300. Associate Professor Nesheim.

The principles of poultry nutrition and their application to poultry feeding and feed manufacturing.

ADVANCED POULTRY NUTRITION

(Agriculture; Poultry Husbandry 510)

Spring. Credit three hours. For graduate students only. Not given every year and not unless ten or more students apply for the course. T 2 and Th 2-4. Rice 201. Professor Scott.*

A study of one or more important fields of research in poultry nutrition, a critical consideration of the experimental methods used in conducting the investigations, and discussion of further studies needed, including the planning of the experiments.

SPECIAL TOPICS IN ANIMAL NUTRITION

(Agriculture; Animal Husbandry 510)

Spring. Credit one hour. Registration by permission. Th 8. Morrison 342. Professors Reid and S. E. Smith.*

A presentation and discussion of the knowledge and techniques of special fields of animal nutrition, with particular reference to farm animals.

SEMINAR IN ANIMAL NUTRITION

(Agriculture; Animal Husbandry 619)

Fall. Credit one hour. Open to graduate students with major or minor field of study in animal nutrition. Registration by permission. T 4:30. Morrison 348. Animal Nutrition staff.

A critical review of the literature and other topics of special interest to graduate students in animal nutrition.

NUTRITION SEMINAR

(School of Nutrition 292)

Spring. Credit one hour. M 4:15. Savage 100. Professor Barnes and faculty.

SEMINAR IN NUTRITION

(Home Economics; Food and Nutrition 420)

Fall. Credit one hour. T 4:30. Van Rensselaer 339. Associate Professor Newman and department faculty.

ADVANCED NUTRITION SERIES (501-504)

A series of nutrition courses offered jointly by the Department of Food and Nutrition, College of Home Economics; the Departments of Animal and of Poultry Husbandry, College of Agriculture; and the Graduate School of Nutrition. Prerequisites: courses in nutrition, physiology, and biochemistry to include intermediary metabolism; or permission of the instructor.

The biochemical and physiological bases of digestion, absorption, transport and metabolism of nutrients; species differences where applicable; and historical as well as current concepts in nutrition.

PROTEINS AND AMINO ACIDS

(Home Economics; Food and Nutrition 501)

Fall. Credit two hours. M W 10. Van Rensselaer 339. Professor Morrison.*

LIPIDS AND CARBOHYDRATES

(Agriculture; Animal Husbandry 502)

Fall. Credit two hours. T 11, F 10. Van Rensselaer 339. Professor R. J. Young.*

NUTRITIONAL ENERGETICS

(Agriculture; Animal Husbandry 503)

Spring. Credit two hours. M W 10. Morrison 342. Professor Reid.*

MINERALS AND VITAMINS

(Agriculture; Animal Husbandry 504)

Spring. Credit two hours. T 11, F 10. Morrison 342. Professor Scott.*

CLINICAL AND PUBLIC HEALTH NUTRITION

(School of Nutrition 392)

Spring. Credit three hours. Prerequisites, a course in nutrition, in physiology, and in biochemistry. Registration by permission of the instructor. For graduate students only. M W F 9. Savage 136. Professor C. M. Young and members of the medical staff.*

Designed to familiarize the student with some of the applications of nutrition to clinical and public health problems.

FIELD OBSERVATION AND EXPERIENCE IN COMMUNITY NUTRITION

(School of Nutrition 381-82)

Throughout the year. Credit one hour (a term). Prerequisites (or in conjunction with), School of Nutrition 392 and Engineering 2509. Registration by permission only. For graduate students only. A two-week full-time field period just prior to the academic year and one to two weeks during the spring recess and/or immediately following final examinations in the spring term. Time and place as arranged. Professor C. M. Young.*

Supervised observation and experience in community nutrition programs. Students must be prepared to defray expense of living costs in the communities selected for the field experience. Every effort will be made to keep costs minimal.

NUTRITION AND DISEASE

(Home Economics; Food and Nutrition 330)

Fall. Credit three hours. Prerequisite, Food and Nutrition 324 or equivalent. Discussion, M W F 9. Van Rensselaer 3-M-11. Associate Professor Rivers.*

Study of the physiological and biochemical anomalies in certain diseases and the principles underlying nutritional therapy. Independent survey of the technical literature in this field.

RESEARCH METHODS IN HUMAN METABOLIC STUDIES

(Home Economics; Food and Nutrition 434)

Spring. Credit three hours. Prerequisites, Food and Nutrition 324 or equivalent, laboratory experience in biochemistry or quantitative analysis, and permission. Lecture and laboratory, T Th 1:30-4:00. Van Rensselaer 426. Department faculty.

Principles of human metabolic research; experimental design of human

studies; dietary considerations; methods of collecting and analyzing biological material; and evaluation. Laboratory will include planning and management of a metabolic study, collection and the appropriate analyses of blood, urine, and feces.

[NUTRITIONAL BIOCHEMISTRY]

(School of Nutrition 160)

Spring. Credit three hours. Prerequisites, Biological Sciences 431 or the equivalent and a beginning course in nutrition, e.g., Animal Husbandry 410, Poultry Husbandry 310, or Food and Nutrition 324. Lectures, T Th S 8. Savage 100. Professors R. H. Barnes and Wright and Associate Professors Gaylor and McCormick.*

The biological bases of processes related to nutrition in the intact animal are discussed. Emphasis is placed on the integration of physiological and biochemical mechanisms in digestion, absorption, transport, and metabolism and include comparative aspects of the normal and pathologic states. Not offered in 1966.

PUBLIC HEALTH

CLINICAL AND PUBLIC HEALTH NUTRITION

(School of Nutrition 392)

Spring. Credit three hours. Prerequisites, a course in nutrition, in physiology, and in biochemistry. Registration by permission of the instructor. For graduate students only. M W F 9. Savage 136. Professor C. M. Young and members of the medical staff.*

Designed to familiarize the student with some of the applications of nutrition to clinical and public health problems.

FIELD OBSERVATION AND EXPERIENCE IN COMMUNITY NUTRITION

(School of Nutrition 381-382)

Throughout the year. Credit one hour (a term). Prerequisites (or in conjunction with), School of Nutrition 392 and Engineering 2509. Registration by permission only. For graduate students only. A two-week full-time field period just prior to the academic year and one to two weeks during the spring recess and/or immediately following final examinations in the spring term. Time and place as arranged. Professor C. M. Young.*

Supervised observation and experience in community nutrition programs. Students must be prepared to defray expense of living costs in the communities selected for the field experience. Every effort will be made to keep costs minimal.

ENVIRONMENTAL SANITATION

(Engineering 2509)

Fall. Credit three hours. Open to non-civil engineering students. M W F 9. Hollister 202. Professor Gates.

Lectures, discussions, reports and field trips. Environmental health concepts and methods and their application to environmental planning and control at the subdivision, municipal, and metropolitan levels. Introduction to water resource planning and development; water quality control; water

supply; municipal, industrial, and private waste-water disposal; air quality control; solid waste disposal and radiological health.

INTRODUCTION TO CLINICAL MEDICINE AND PUBLIC HEALTH PROGRAMS

(Business and Public Administration 141)

Spring. Credit three hours. Malott Hall. Visiting Professor Samson and Associate Professor L. K. Young.

The objective of this course is to familiarize the student with the principal diseases of modern life and to demonstrate how these conditions are controlled in individuals and in communities. Major emphasis is given to those conditions which directly affect the management of hospitals. Consideration is given to the training of physicians, medical and surgical specialists, nurses, and other personnel; the nature of specialized hospital equipment and other facilities for diagnosis and treatment; and the principal procedures used by physicians in diagnosis and treatment in hospitals and in their offices. For those diseases amenable to group action for community-wide control, the nature of control measures by various public and private agencies and the effectiveness of legislation and of voluntary action in such control are examined. Major public health problems of various parts of the contemporary world are discussed, and visits are made to near-by hospitals and medical centers at appropriate points in this course.

SEMINAR ON HEALTH AND SOCIETY

(Business and Public Administration 455)

Spring. Credit three hours. Malott Hall. Associate Professor White.

The primary objective is to increase the student's ability to evaluate research reports and other studies, to assess their relevance for the field, and to formulate his own problems in a manner conducive to scientific investigation. An examination is made of the contributions of the social sciences and other disciplines to an understanding of current problems in the health field and in hospital administration in particular.

BIOCHEMISTRY

PRINCIPLES OF BIOCHEMISTRY, LECTURES

(Biological Sciences 431)

Fall. Credit four hours. Prerequisites, Organic Chemistry 353-355 or the equivalent. Lectures, M 8, Morrison 146; T Th S 8, Plant Science 233. Professor Daniel.

A basic course dealing with the chemistry of biological substances and their transformations in living organisms.

PRINCIPLES OF BIOCHEMISTRY, LABORATORY

(Biological Sciences 433)

Fall. Credit three hours. Prerequisites, quantitative analysis, or permission of the instructor. Must be taken with or following Biological Sciences 431. Laboratory, M W or T Th 2-4:30; one discussion period to be arranged. Wing 106. Preliminary examinations will be held twice during the semester at 7:30 p.m. Associate Professor Neal and assistants.

Laboratory practice with biochemical substances and experiments designed to illustrate reactions which may occur in biological systems.

[BIOCHEMISTRY OF THE VITAMINS]

(Biological Sciences 530)

Spring. Credit two hours. Given in alternate years. Prerequisite, Chemistry 353-355 and Biological Sciences 431 or their equivalent. Lecture T Th 10. Savage 100. Professor Daniel.* †

The chemical, physiological and biochemical aspects of the vitamins. Not offered in 1966.

GENERAL BIOCHEMISTRY, LECTURES

(Biological Sciences 531)

Fall. Credit four hours. Prerequisites, quantitative analysis, Organic Chemistry 358 or the equivalent, or permission of the instructor. Lectures, M W F S 9. Savage 100. Assistant Professor Calvo.

An integrated treatment of the fundamentals of biochemistry.

GENERAL BIOCHEMISTRY, LABORATORY

(Biological Sciences 533)

Fall. Credit three hours. Prerequisites, quantitative analysis, or permission of the instructor. Must be taken with or following Biological Sciences 531. Laboratory, M W or T Th 2-4:30; one discussion period to be arranged. Wing 107. Preliminary examinations will be held twice during the semester at 7:30 p.m. Associate Professor Neal and assistants.

Laboratory practice with biochemical substances and experiments designed to illustrate reactions which may occur in biological systems.

ADVANCED GENERAL BIOCHEMISTRY, LECTURES

(Biological Science 534)

Spring. Credit four hours. Prerequisites, Biological Sciences 531 and Physical Chemistry 390 or permission of instructor. Lectures, M W F S 9. Savage 100. Staff.

A broad treatment of biochemistry at an advanced level.

ADVANCED GENERAL BIOCHEMISTRY, LABORATORY

(Biological Sciences 536)

Spring. Credit three hours. Prerequisites, Biological Sciences 533 or the equivalent and Biological Sciences 534 (may be taken concurrently). Registration by permission of instructor before November 1. Laboratory, M W 1:40-4:30; additional periods to be arranged. Wing 106. Professor Nelson and assistants.

Selected experiments on carbohydrates, lipids, proteins, amino acids, nucleic acids, and metabolism (cellular particulates, kinetics, general enzymology) will be given to illustrate basic biochemical principles. The quantitative aspects rather than qualitative identifications will be emphasized.

ADVANCED BIOCHEMISTRY, LECTURES

(Biological Sciences 537-538)

Fall and spring. Credit one or two hours a term. Students may take one or more sections of the course for one to four hours credit, as each section may be taken without having taken a preceding section. Prerequisite, Biological Sciences 534. Lecture, T Th 9. Savage 100.*

Advanced lectures divided into four sections of one hour credit each. Fall

term, Associate Professor Gaylor, carbohydrates and lipids, one hour; Professor Hess, proteins and enzymes, one hour. Spring term, Assistant Professor Calvo, nucleic acids and control mechanisms, one hour; Associate Professor Thompson, plant biochemistry, one hour.

[NUTRITIONAL BIOCHEMISTRY]

(School of Nutrition 160)

Spring. Credit three hours. Prerequisites, Biological Sciences 431 or the equivalent and a beginning course in nutrition, e.g., Animal Husbandry 410, Poultry Husbandry 310, or Food and Nutrition 324. Lectures. T Th S 8. Savage 100. Professors R. H. Barnes and Wright and Associate Professors Gaylor and McCormick.*

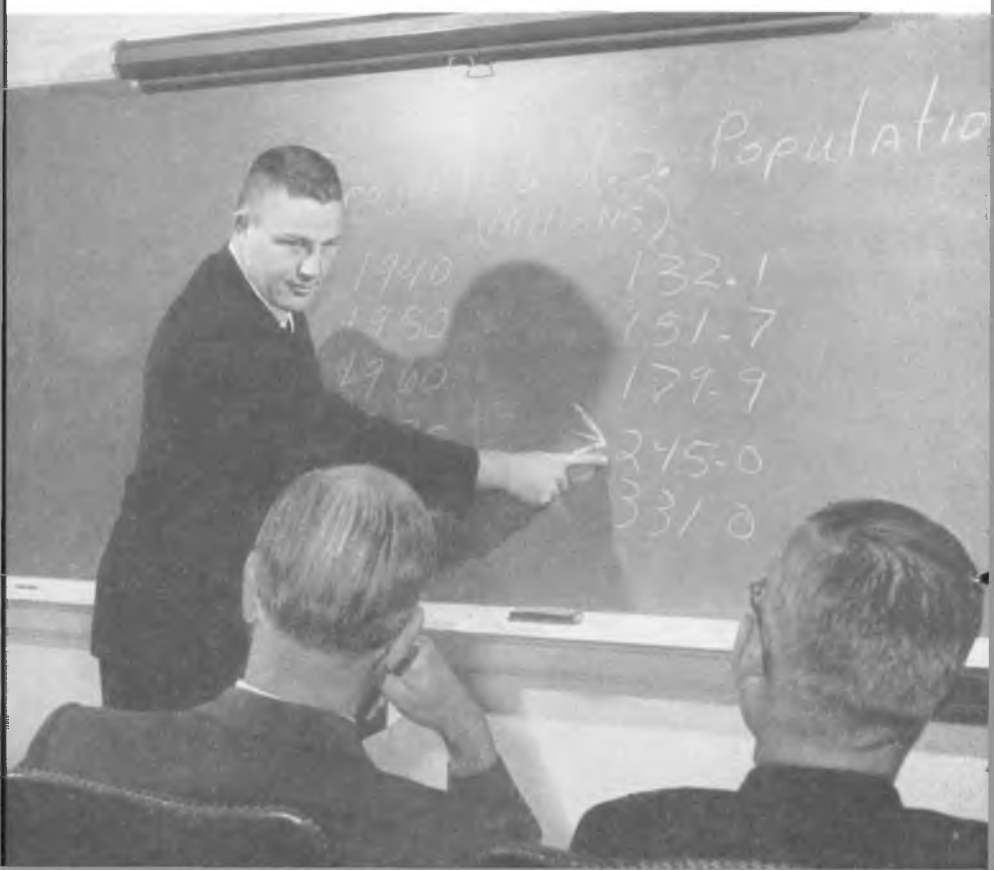
The biological bases of processes related to nutrition in the intact animal are discussed. Emphasis is placed on the integration of physiological and biochemical mechanisms in digestion, absorption, transport, and metabolism and include comparative aspects of the normal and pathologic states. Not offered in 1966.

FOOD BIOCHEMISTRY

(Agriculture; Food Science 410)

Spring. Credit three hours. Prerequisite, Food Science 400. Lectures M W F

The School's economist discussing food supply and population at conference.



11. Stocking 120. Associate Professor Shallenberger and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.†

A discussion of some of the important non-microbial changes in foods, such as denaturation and the Maillard browning reaction. Emphasis is placed on the occurrence, significance, and prevention or control of the changes as they affect the color, odor, flavor, texture, or nutritive value of foods.

GRADUATE SEMINAR IN BIOCHEMISTRY

(Biological Sciences 631)

Fall and spring. Credit one hour per term. Hours to be arranged. Savage 100. Staff.

Required of all graduate students majoring in biochemistry. The course may be repeated for credit.

BIOCHEMISTRY SEMINAR

(Biological Sciences 639)

Fall and spring. No credit. F 4:15. Savage 100. Staff.

Lectures on current research in biochemistry presented by distinguished visitors and staff.

NUTRITION SEMINAR

(School of Nutrition 292)

Spring. Credit one hour. Registration by permission. M 4:15. Savage 100. Professor R. H. Barnes and faculty.

FOOD BIOCHEMISTRY SEMINAR

(School of Nutrition 294)

Fall. Credit one hour. Registration by permission. M 4:30. Savage 130. Professor R. H. Barnes, Associate Professor Shallenberger, and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.

Assignments and discussions of literature pertaining to the biochemical aspects of foods and food processing.

CHEMISTRY AND PHYSICS

INTRODUCTORY PHYSICAL CHEMISTRY

(Arts and Sciences; Chemistry 285-286)

Throughout the year. Credit five hours a term. Prerequisites, Chemistry 108 or 116. Mathematics 192, Physics 123, or consent of instructor. For students in engineering. Lectures, M W F 9. Laboratory lecture, F 12. Laboratories: fall term, M 1:40-4:30 and T 10-12:50 or W Th 1:40-4:30; spring term, M T 1:40-4:30 or W Th 1:30-4:30. Professor Hughes, Assistant Professor Lind, and assistants.

The lectures will give a systematic treatment of the fundamental principles of physical chemistry; the laboratory will deal with the experimental aspects of the subject and also develop the needed skills in quantitative chemical analysis.

INTRODUCTORY PHYSICAL CHEMISTRY

(Arts and Sciences; Chemistry 387-388)

Throughout the year. Credit five hours a term. Prerequisites, Chemistry 236, Mathematics 213 or 221, Physics 208, or consent of instructor. Chemistry 387 is prerequisite to Chemistry 388. Required of candidates for the degree of A.B. with a major in chemistry. Lectures, M W F 10. Laboratory: fall term, T 1:40-4:30 or F 1:40-4:30; spring term, M T 1:40-4:30 or W F 1:40-4:30. Laboratory lecture (fall term only), Th 12. Examinations, Th 7:30. Professor Bauer, Associate Professor Hoffman and assistants.

A study of the more fundamental principles of physical chemistry from the standpoint of the laws of thermodynamics and of the kinetic theory. The laboratory will consist of experiments illustrating laboratory techniques as well as experiments in classical and modern physical chemistry.

CHEMISTRY OF NATURAL PRODUCTS

(Arts and Sciences; Chemistry 574)

Spring. Credit three hours. Prerequisites, Chemistry 456 or 457, and 465-466. Primarily for graduate students. Lecture, T Th 9 and discussion period M 4:30. Professor Meinwald.

Particular attention will be devoted to methods of structure determination and synthesis as applied to selected terpenes, steroids, alkaloids, and antibiotics.

PHYSICAL CHEMISTRY OF PROTEINS

(Arts and Sciences; Chemistry 586)

Spring. Credit four hours. Prerequisite, Chemistry 286 or 388. Primarily for graduate students. Lectures, M W F 8 and S 10. Professor Scheraga.

Chemical constitution, molecular weight, and structural basis of proteins; thermodynamic, hydrodynamic, optical, and electrical properties; protein and enzyme reactions.

PHYSICS FOR STUDENTS OF BIOLOGY

(Arts and Sciences; Physics 200)

Fall. Credit four hours. Prerequisites, Physics 102 or 208, six credit hours of college work in chemistry, and six in biological science. Students offering Physics 102 who have an average grade therein below 70 must obtain permission of the instructor. Lectures, T Th 12. Laboratory, T or F 2-4. Individual conferences to be arranged. One term paper required. Professor L. L. Barnes and staff.

Lectures, laboratory experiments, and conferences. Selected topics related to the study of biology are chosen from properties of matter, electricity, electromagnetic radiation, and nuclear physics.

GENERAL PHYSICS

(Arts and Sciences; Physics 101-102)

Throughout the year. Credit four hours a term. Prerequisite, three years of college preparatory mathematics or permission of the instructor. Physics 101 is prerequisite to 102. Designed as a two-term survey course similar to but less analytically demanding than Physics 207-208. Most students majoring in a natural science who have had or are co-registered in calculus should elect Physics 207-208 instead of this course. Demonstration lectures, M W 9 or 11. Two discussion hours per week and one two-hour laboratory alternate

weeks, as assigned. Preliminary examinations will be held at 8 p.m. during three evenings each term. Professor Chester, Associate Professors Cotts and Hand, and staff.

Basic principles and their relation to other physical sciences. Topics include motion, dynamics, conservation laws, kinetic theory, gravitational and electromagnetic forces and fields, wave motion and light, relativity, atomic physics, structure of matter, and nuclear physics. As time permits, philosophical and social overtones are discussed. At the level of *Fundamental Physics* by Orear.

ECONOMICS

FOOD ECONOMICS

(*School of Nutrition 159*)

Spring. Credit three hours. Lecture and discussion M W F 11. Savage 100. Associate Professor Call.†

Designed for students who are interested in any aspect of the food industry. Emphasis is placed on the economics of food production, processing, marketing, and consumption. Attention is given to both United States and international food problems in a systematic treatment of economic principles applicable to the food sector of any economy.

MARKETING

(*Agriculture; Agricultural Economics 240*)

Fall or spring. Credit three hours. Lectures M W F 11; one discussion period only, during the first week of the term: M T W Th or F 2-4 or S 9-11. Warren 45. Professor Darrah.

A study of how food products are marketed. Special attention is given to the consumption of food products, factors that affect consumption, market channels, operation of different marketing agencies, storage, transportation, packaging, product identification, advertising and promotion, buying, selling, and costs.

SEMINAR IN WORLD PROBLEMS OF FOOD AND POPULATION

(*School of Nutrition 250*)

Spring. Credit two hours. Open only to graduate students. Registration by permission. W 7:30 p.m. Savage 130. Professor van Veen and Associate Professor Call.†

Demographic behavior, population and food supply, and comparative agriculture.

SURVEY OF INDUSTRIAL AND LABOR RELATIONS

(*Industrial and Labor Relations 250*)

Fall and spring. Credit three hours. M W F 12. Ives Hall. Professors Carpenter, Windmuller or Associate Professor Polisar.

A survey for students in other divisions of the University. An analysis of the major problems in industrial and labor relations: labor union history, organization, and operation; labor market analysis and employment practices; industrial and labor legislation, and social security; personnel management and human relations in industry; collective bargaining; mediation and arbitration; the rights and responsibilities of employers and employees; the major governmental agencies concerned with industrial and labor relations.

ADVANCED ORGANIZATION AND MANAGEMENT

(*Home Economics; Institution Management 425*)

Spring. Credit two hours. Instructor's signature required for preregistration. M F 2. Van Rensselaer 24.

Analysis and interpretation of major administrative problems in the operation of a dietary department. Scientific application of business management, budgetary and production control principles are studied in relation to quantity meal service.

ECONOMICS OF AGRICULTURAL DEVELOPMENT

(*Agriculture; Economics of Agricultural Development 364*)

Spring. Credit three hours. Prerequisite, Course 150, Economics 103-104, or consent of the instructor. Lectures, T Th S 9. Warren 345. Associate Professor Mellor.

A discussion of the special problems of agricultural development, in low per-capita income areas and countries. Attention will be devoted to the relationship between development in agriculture and in other sectors of the economy, capital and capital formation, the role of land and land reform, increasing efficiency in resource use, coordination problems in agricultural development, and the like.

FOOD SCIENCE

PRINCIPLES OF FOOD TECHNOLOGY

(*Agriculture; Food Science 361-362*)

Throughout the year. Credit three or five hours a term. Prerequisites, Chemistry 353 or equivalent, Biological Sciences 290, Physics 102. Lectures T Th 10. (Riley-Robb 225. Laboratory, Th 2-4:30. Riley-Robb 44. For those who register for 5 hours credit: prerequisite, a course in calculus, or analytical geometry and differential equations, and a course in biochemistry. Additional lecture and laboratory, T 1-4:30. Riley-Robb 44. Associate Professor Buck.†

The fundamentals involved in the processing, production, and distribution of raw material to finished product, with emphasis on the unit operations and processes employed by the canning, freezing, fermentation, and dehydration industries. The fundamental and physical properties of foods, and their nutritive components, food additives and preservatives, and the principles of manufacture are discussed. Laboratory practice involves actual processing and preservation of various food products, and field trips.

FOOD BIOCHEMISTRY

(*Agriculture; Food Science 410*)

Spring. Credit three hours. Prerequisite, Food Science 400. Lectures M W F 11. Stocking 120. Associate Professor Shallenberger and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.†

A discussion of some of the important non-microbial changes in foods, such as denaturation and the Maillard browning reaction. Emphasis is placed on the occurrence, significance, and prevention or control of the changes as they affect the color, odor, flavor, texture, or nutritive value of foods.

FOOD BIOCHEMISTRY SEMINAR*(School of Nutrition 294)*

Fall. Credit one hour. Registration by permission. M 4:30. Savage 130. Professor R. H. Barnes, Associate Professor Shallenberger, and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.

Assignments and discussions of literature pertaining to the biochemical aspects of foods and food processing.

FOOD PROCESSING INSTRUMENTATION*(Agriculture; Food Science 466)*

Fall. Credit three hours. Prerequisite or concurrent, Food Science 361. Lectures, M W 9. Riley-Robb 225. Laboratory, F 2-4:30. Riley-Robb 146. Assistant Professor Nowrey.

Principles of engineering analysis and judgment are employed in examination of instruments for measurement and control of food processes. Topics include pressure, temperature, and flow measurements, plus selected instruments for measuring physical and chemical properties of foods. Electronic components of electrical instruments are discussed. The use of instruments in the enforcement of food laws is also presented.

FOOD ENGINEERING CALCULATIONS*(Agriculture; Food Science 467)*

Spring. Credit three hours. Prerequisite, Food Science 361. Lectures, M W 9. Riley-Robb 225. Laboratory, F 2-4:30. Riley-Robb 146. Assistant Professor Nowrey.

Analysis and presentation of technical data collected from food processes using statistical and graphical methods. Empirical equations and dimensional analyses are also discussed. The use of computers in programing food processes is presented.

FLUID MILK PROCESSING AND QUALITY CONTROL*(Agriculture; Dairy Science 232)*

Spring. Credit four hours. Given in alternate years. Prerequisites, Dairy Science 162 and Biological Sciences 290 or its equivalent. Lectures, M F 10. Recitation, F 12. Stocking 120. Laboratory, F 2-4:30. Stocking 127. Associate Professor March and assistants.†

The scientific, technical, and sanitary aspects of the fluid-milk industry.

[CONCENTRATION AND FREEZING OF MILK AND MILK PRODUCTS]*(Agriculture; Dairy Science 334)*

Spring. Credit five hours. Given in alternate years. Prerequisite, Dairy Science 232. Lectures, T Th 11-12:50. Laboratory, T Th 1:40-4:30. Stocking 120. Professor Jordan and assistant.

The principles and practice of making condensed and evaporated milk, milk powders, ice cream, and by-products, including a study of the physical, chemical, and biological factors involved. Not offered in 1966.

DAIRY AND FOOD ENGINEERING*(Agriculture; Dairy Science 340)*

Fall. Credit four hours. Given in alternate years. Prerequisites, Physics 101

and 102 or the equivalent and Dairy Science 162. Lectures, M W 10. Laboratory, W 2-4:30. Stocking 120. Professor Jordan.†

Engineering aspects of dairy and food-plant operations.

FOOD PRODUCTS FROM MILK FERMENTATIONS

(*Agriculture; Dairy Science 430*)

Fall. Credit five hours. Given in alternate years. Prerequisites, Dairy Science 162, Biological Sciences 290, and organic chemistry or biochemistry. Lectures and laboratories, T Th 11-12:50 and 1:40-4:30. Stocking 120. Professor Kosikowski and Assistant Professor Ledford.†

The chemistry, bacteriology, and technology of milk fermentations leading to important foods, including cheese, butter, yoghurt, sour cream, buttermilk, and fermented milks. Consideration is given to chemical by-products of milk fermentations such as casein, lactic acid, and alcohol. Line-flow processing practices are carried out in the laboratory.

CHEMISTRY OF MILK

(*Agriculture; Dairy Science 433*)

Fall. Credit two hours. Prerequisites, qualitative and quantitative analysis and organic chemistry. Hours by arrangement. Stocking 120. Assistant Professor Sherbon.†

The subject matter changes from year to year. It may deal with colloidal phenomena in milk and its products. It may deal with the enzymes of milk, with milk proteins, with milk fat, or with chemical reactions and equilibria in dairy products. Graduate students may reregister in successive years and find little duplication of material.

ANALYTICAL METHODS

(*Agriculture; Dairy Science 531*)

Spring. Credit four hours. Prerequisites, college physics and quantitative analysis. Lectures, T Th 11. Stocking 119. Laboratory practice, T 1-5, Stocking 120. Assistant Professor Sherbon and assistant.†

A study of the more important operations and apparatus used in quantitative analysis, and their practical application.

SCIENCE OF FOOD

(*Home Economics; Food and Nutrition 316*)

Fall. Credit three (lectures only) or four hours. Prerequisite, Food and Nutrition 215 or 217, and a college course in organic or biochemistry. Students who have had limited laboratory experience in comparative foods *must* register for four hours. Lecture, T Th S 9. Van Rensselaer 339. For students registered for four credit hours, laboratory Th 2-4. Van Rensselaer 358. Professor Hester and Associate Professor Armbruster.†

Scientific principles underlying modern food theory and practice. The relation to food preparation of the physical and chemical properties of proteins, fats, starches, sugars, leavening agents, and pigments; the properties of true solutions and principles of crystallization; colloidal systems—gels, sols, foams, and emulsions. Laboratory experiments designed to illustrate the effect of varying ingredients and preparation procedures on the quality of food products.

SCIENCE OF FOOD — LABORATORY

(*Home Economics; Food and Nutrition 317*)

Fall. Credit one hour. Prerequisite or parallel, Food and Nutrition 316.

Laboratory T or W 1:40-4:30. Van Rensselaer 358. Assistant Professor Donald.†

Laboratory experiments designed to illustrate the physiochemical behavior of colloidal and crystalline systems and chemical reactions of the food components.

EXPERIMENTAL FOOD METHODS

(*Home Economics; Food and Nutrition 318*)

Spring. Credit three hours. Prerequisite, Food and Nutrition 316. A course in statistics and Food and Nutrition 317 are desirable but not required. Laboratory, M F 1:30-4:30. Van Rensselaer 358. Associate Professor Armbruster.†

Application of scientific theories and methods in the design and performance of experimental food problems and in the interpretation and evaluation of results. Independent laboratory problems.

SPECIAL PROBLEMS FOR GRADUATE STUDENTS

(*Home Economics; Food and Nutrition 403*)

Fall and spring. Credit and hours to be arranged. Department faculty.†

For graduate students recommended by their chairmen and approved by the instructor in charge for independent, advanced work. Experience in research laboratories in the department may be arranged.

READINGS IN FOOD

(*Home Economics; Food and Nutrition 404*)

Fall. Credit two hours. Prerequisite, Food and Nutrition 316 or equivalent. T Th 11. Van Rensselaer 301. Department faculty.†

Critical review of current literature. Emphasis on experimental data basic to the scientific principles underlying modern theory and practice in food preparation.

SEMINAR IN FOOD

(*Home Economics; Food and Nutrition 421*)

Spring. Credit one hour. T 4:30. Van Rensselaer 339. Associate Professor Armbruster and department faculty.

SANITARY ASPECTS OF MENU ITEM PREPARATION IN QUANTITY

(*Home Economics; Institution Management 429*)

Spring. Credit two hours. Graduate section of Institution Management 329. Instructor's signature required for preregistration. T Th 11 and additional conferences to be arranged. Van Rensselaer 3-M-11. Professor Longr e.

Topics will include sources of food contamination, holding conditions as they affect bacterial multiplication, and principles of sanitary handling and holding of ingredients and menu items, as they apply to hospital and school food services. Emphasis will be placed on the presentation of recent research data.

POULTRY MEAT AND EGG TECHNOLOGY

(*Agriculture; Poultry Husbandry 450*)

Spring. Credit three hours. Given in alternate years. Prerequisites, Chemistry 303, or its equivalent, and Biological Sciences 290. Lectures, T Th 9. Laboratory, M 2-4. Rice 101. Professor Baker.†

A discussion and study of some of the important microbial and nonmicrobial changes in poultry meat and eggs as well as the chemical composition and preservation of these products. Development of new products is also emphasized.

POST-HARVEST PHYSIOLOGY, HANDLING, AND STORAGE OF FRUITS

(Agriculture; Pomology 201)

Fall. Credit three hours. Prerequisite, Pomology 101 or 102. Lectures, T Th 8. Plant Science 143. Laboratory, F 2-4:30. Plant Science 107. Professor Smock.†

The chemistry and physiology of fruits as they affect quality and marketability are studied. Handling methods, maturity indices, and storage practices are considered. Practical work involves grading and inspection of fruits and storage of fruit in different ways. One Saturday field trip is required.

POTATO PRODUCTION AND PROCESSING

(Agriculture; Vegetable Crops 222)

Spring. Credit three hours. Lectures, T Th 10. East Roberts 222. Laboratory, T 2-4:30. East Roberts 223. Professor Ora Smith.†

General principles and practical phases of potato production, storage, and processing are discussed. Growth processes and soil and environmental factors are emphasized as influencing production. Topics such as storage methods, grading, packaging, cooking quality, nutritive value, processing, and industrial uses of potatoes also are studied. Two field trips, one of which is all-day, are taken to potato farms and processing plants.

VEGETABLE CROPS, ADVANCED COURSE

(Agriculture; Vegetable Crops 401)

Fall. Credit four hours. Prerequisites, Vegetable Crops 211 and Biological Sciences 240. Lectures, M W F 11. East Roberts 222. Laboratory M 2-4:30. East Roberts 223. Professor Kelly.

A systematic study of the literature dealing with practices in vegetable production. Results of experiments that have been conducted or are being conducted are studied, and their application to the solution of practical problems is discussed.

HANDLING AND MARKETING VEGETABLES, ADVANCED COURSE

(Agriculture; Vegetable Crops 412)

Fall. Credit four hours. Lectures, T Th 11. East Roberts 222. Laboratory, T or W 2-4:30. East Roberts 223. Professor Hartman.†

(Students registered for the Tuesday laboratory are scheduled to go on a field trip at 9:30 a.m., on Wednesday, the day on which classes officially begin at noon in the fall term.)

The handling of vegetables from harvest, whether for fresh market or processing, through the marketing channels to the consumer; personnel, facilities, machinery, and organization of the industry; quality measurement and grade standards; federal, state, and other regulations; principles and practices in precooling, storage, packaging, pre-packaging, other types of handling.

RESEARCH METHODS IN VEGETABLE CROPS

(Agriculture; Vegetable Crops 501)

Spring. Credit four hours. Offered in alternate years. Prerequisite, Vegetable

Crops 401. It is recommended that Plant Breeding 510 and 511 precede or accompany this course. Professor Kelly.

A study of research techniques peculiar to vegetable crops.

MATHEMATICS

CALCULUS

(Arts and Sciences; Mathematics 111)

Either term. Credit three hours. Fall term: lectures, M W F 11, 12; T Th S 11, 12 plus one hour to be arranged. Spring term: M W F 8, 9, 10; T Th S 8, 11, 12. Preliminary examinations will be held at 7 p.m. during three evenings each term. Fall term: Professors Kesten and Rosenberg.

Plane analytic geometry, differentiation and integration of algebraic and trigonometric functions, applications. In the fall term, the third lecture each week will be of a special character, devoted to a more rigorous approach to the calculus.

CALCULUS

(Arts and Sciences; Mathematics 112)

Either term. Credit three hours. Prerequisite, Mathematics 111. Fall: M W F 9, 10; T Th S 9, 10. Spring term: lectures M W 11, 12; T Th 12 plus one hour

International nutritionists survey the nutritional status of children in a school feeding program in Syria.



to be arranged. Preliminary examinations will be held at 7 p.m. on Mar. 14, April 18, May 16. Spring term, Assistant Professors Greenblatt and Rinehart.

Differentiation and integration of elementary transcendental functions, the technique of integration, conic sections, polar coordinates, infinite series.

STATISTICAL METHODS I

(*Agriculture; Plant Breeding 510*)

Fall. Credit three hours. Prerequisite, graduate standing or permission of instructor. T Th S 10. Warren 345. Laboratory to be arranged.

The distributions of statistics encountered in biological and other fields are considered from the point of view of elementary probability notions and by sampling from known populations. The results, with principles of experimentation, are applied to the conducting of experiments and interpretation of results. The nature and validity of experimental error are treated. Topics include point and interval estimation, tests of hypotheses, the simpler experimental designs and their analyses of variance, linear regression, correlation, and methods involving rank order and rank sum procedures.

STATISTICAL METHODS II

(*Agriculture; Plant Breeding 511*)

Spring. Credit three hours. Prerequisite, Plant Breeding 510 or the equivalent. T Th S 10. Warren 345. Laboratory to be arranged.

The work of Plant Breeding 510 is continued. Topics include factorial experiments, individual degrees of freedom, analysis of covariance, analysis of variance of two-way classifications with disproportionate numbers, multiple and curvilinear regression, curve fitting, the treatment of discrete data, some recent developments in statistics.

ECONOMIC AND SOCIAL STATISTICS

(*Industrial and Labor Relations 510*)

Fall and spring terms. Credit three hours. Lectures, T Th 2. Laboratory Th 9-10:50; F 1:40-3:30. Professor McCarthy.

A non-mathematical course for graduate students in the social studies without previous training in statistical method. Emphasis will be placed on discussion of technical aspects of statistical analysis and on initiative in selecting and applying statistical methods to research problems. The subjects ordinarily covered will include analysis of frequency distributions, time series (including index numbers), regression and correlation analysis, and selected topics from the area of statistical inference.

MICROBIOLOGY

GENERAL MICROBIOLOGY

(*Biological Sciences 290*)

Either term. Credit five hours. Prerequisites, Biological Sciences 101-102 or 103-104 and Chemistry 104 or 108 or the equivalent. Lectures, M W F 11. Stocking 218. Laboratory, M W 2-4:30; T Th 8-10:30 or 2-4:30. Stocking 301: spring term M W section in Stocking 321. Professors Seeley (fall) and Van-Demark (spring).

An introductory course; a study of the basic principles and relationships in the field of microbiology, with fundamentals necessary to further work in the subject.

The course offering in the spring term will provide special emphasis on the application of microbiology in home economics and agriculture.

GENERAL MICROBIOLOGY, LECTURES

(Biological Sciences 290a)

Either term. Credit three hours. Prerequisites, Biological Sciences 101-102 or 103-104 and Chemistry 104 or 108 or the equivalent. Lectures, M W F 11. Stocking 218. Professors Seeley (fall) and VanDemark (spring).

The same as the lecture part of Biological Sciences 290. Will not serve alone as a prerequisite for advanced microbiology courses.

GENERAL MICROBIOLOGY, LABORATORY

(Biological Sciences 290b)

Either term. Credit two hours. Professors Seeley (fall) and VanDemark (spring).

The same as the laboratory part of Biological Sciences 290. May be taken only by special permission of the instructor.

ADVANCED BACTERIOLOGY

(Biological Sciences 390)

Spring. Credit four hours. Prerequisites, Biological Sciences 290 and organic chemistry and permission of instructor. Lectures, M W 7 p.m. Stocking 119. Laboratory, T Th 1:40-4:30. Stocking 321. Professor MacDonald.

A comparative study of the physiological and ecological relationships among the bacteria. Among the topics discussed will be cell anatomy, cellular control mechanisms, ecology, taxonomy, and autotrophy. Special emphasis will be placed on those groups of bacteria outside the Eubacteriales. Laboratory emphasis will be on the technique for isolation, cultivation, and rigorous study of various groups of bacteria. Emphasis will be on independent work, and several laboratory reports will be required.

ADVANCED BACTERIOLOGY, LECTURES

(Biological Sciences 390a)

Spring. Credit two hours. Prerequisites, Biological Sciences 290 and organic chemistry. Lectures, M W 7 p.m. Stocking 119. Professor MacDonald.

This course is the same as the lecture portion of Course 390, except that the permission of the instructor is not required.

[APPLIED AND INDUSTRIAL MICROBIOLOGY]

(Biological Sciences 393)

Fall term. Credit three hours. Given in alternate years. Prerequisites, Biological Sciences 290 or the equivalent. Lectures, T Th 11, S 10. Stocking 119. Professors Delwiche, Seeley, and VanDemark.

A survey of the microbiology of industrial fermentations, water, and waste decomposition. Not offered in 1966.

DAIRY AND FOOD MICROBIOLOGY

(Biological Sciences 394)

Spring. Credit four hours. Prerequisite, Biological Sciences 290. Lectures, M W 12. Stocking 301. Professor Naylor.

The major families of microorganisms of importance in dairy and food science are studied systematically with emphasis on the role played by these

organisms in food preservation, food fermentations, and public health. The laboratory work includes practice in the use of general and special methods for microbiological testing and control of dairy and food products as well as practice in the isolation and characterization of organisms found in foods.

PHYSIOLOGY OF BACTERIA

(Biological Sciences 396)

Spring. Credit three hours. Prerequisites, Biological Sciences 290 and at least one semester of organic chemistry. Lectures, T Th 10. Stocking 119. Professor Delwiche.

The functions of microorganisms, primarily bacteria. Particular consideration is given to the dynamics of the growth process, the nutrition and energy metabolism of the developing cultures, and the effects of the physical and chemical environments on the growth process. Primarily the treatment is concerned with the eubacteria, but consideration is given to other microbial forms when appropriate to an integrated treatment of the subject matter.

MORPHOLOGY AND CYTOLOGY OF BACTERIA

(Biological Sciences 493)

Fall. Credit three hours. Prerequisite, permission of the instructor. Lectures, T Th S 9. Stocking 119. Professor Knaysi.

Morphology, cytology, and microchemistry of microorganisms.

CHEMISTRY OF MICROBIAL PROCESSES

(Biological Sciences 496)

Spring. Credit two hours. Prerequisites, beginning courses in general microbiology, biochemistry, and organic chemistry. This course is intended for upperclassmen and graduate students. Lectures, M W 11. Stocking 119. Professor Delwiche.

Selected topics pertaining to the energy metabolism, oxidative and fermentative abilities, and biosynthetic capacities of microorganisms. Where possible and appropriate the subject matter deals with the various microbial forms in a comparative sense.

PATHOLOGY

PATHOLOGY OF NUTRITIONAL DISEASES

(Veterinary; Pathology 931)

Spring. Credit three hours. Lecture and laboratory. Hours to be arranged. Designed primarily for graduate students of nutrition. Prerequisites, Pathology 630 and 631. Professor Krook.*

PHYSICAL BIOLOGY

RADIOISOTOPES IN BIOLOGICAL

RESEARCH — PRINCIPLES AND PRACTICE

(Veterinary; Physical Biology 921)

Spring. Credit four hours. Lectures, T Th 11. Laboratory, M T or W 1:30-5.

Prerequisites, a course in quantitative chemistry and permission of instructor. Professor Lengemann and staff.

Lectures, demonstrations, and laboratory on the fundamentals of atomic energy procedures and applications to biological research.

BIOLOGICAL EFFECTS OF RADIATION

(Veterinary; Physical Biology 922)

Fall. Credit three hours. Lectures, T Th 10; laboratory, Th 1:30-5. Assistant Professor Casarett.

Lectures and demonstrations on radiation physics, radiation, chemistry, radiation effects at the cellular level, radiation effects in multicellular organisms, genetic effects of radiation, and radioprotective and radiomimetic substances.

BIOLOGICAL MEMBRANES AND NUTRIENT TRANSFER

(Veterinary; Physical Biology 923)

Spring. Credit two hours. Lectures (time to be designated). Prerequisites, animal or plant physiology, quantitative and organic chemistry, physics, and consent of instructor. Cellular physiology and elementary physical chemistry desirable. Professor Wasserman.

An introduction to elementary biophysical properties of biological membranes, theoretical aspects or permeability and transport, and mechanism of transfer of inorganic and organic substances across intestine, placenta, kidney, erythrocytes, bacteria, and other biological systems.

PHYSIOLOGY

HISTOLOGY: THE BIOLOGY OF THE TISSUES

(Biological Sciences 313)

Fall. Credit four hours. Prerequisites, a two-semester introductory biology sequence; comparative anatomy and organic chemistry or biochemistry desirable. Lectures, T Th 11. Stimson G1. Laboratory, T Th 8-10:30 or 2-4:30. Stimson 206. Professor Wimsatt.

A general course dealing with the biology of the tissues to provide the student with a basis for understanding the microscopic and line structural organization of vertebrates and the methods of analytic morphology at the cell and tissue levels. The dynamic interrelations of structure, chemical composition, and function in cells and tissues are stressed.

SPECIAL HISTOLOGY: THE BIOLOGY OF THE ORGANS

(Biological Sciences 412)

Spring. Credit four hours. Given in alternate years. Prerequisites, Biological Sciences 313, or consent of instructor. Enrollment limited to 18 students. Lectures, W F 9. Stimson 105. Laboratory, W F 2-4:30. Stimson 206. Professor Wimsatt.

A continuation of Biological Sciences 313. The microscopic and ultrastructural organization of the principal vertebrate organ systems are studied in relation to their development, functional interaction, and special physiological roles. Biological Sciences 313 and 412 together present the fundamental aspects of the microscopic and submicroscopic organization of the vertebrate

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body from a physiological perspective. The organization of the course involves student participation in "lecture-seminars," and the prosecution of independent project work supplementary to the regular work of the laboratory. The latter enables students to gain practical experience with histological and histochemical preparative techniques.

GENERAL ANIMAL PHYSIOLOGY, LECTURES

(Biological Sciences 413)

Fall. Credit three hours. Prerequisites, one year of biology and courses in chemistry; organic chemistry and biochemistry desirable. Lectures, M W F 10. Stimson G25. Associate Professor McFarland.

The principles of animal physiology are developed through consideration of the functioning of cells, tissues, and organs. Specific topics discussed include respiration, metabolism, circulation, excretion, chemical integration, muscle contraction, nerve action, and sensory reception.

GENERAL ANIMAL PHYSIOLOGY, LABORATORY

(Biological Sciences 413a)

Fall. Credit one hour. Prerequisites, Biological Sciences 413 or equivalent must be taken concurrently. Lecture W 2, alternate weeks only. Stimson G25. Laboratory, T 8-11 or M T or F 1:40-4:30, alternate weeks. Stimson 306. Associate Professor McFarland.

Students are introduced to basic techniques utilized in the study of the physiology of animal tissues. Experiments cover topics dealing with respiration, properties of muscle, circulation, activity of nerves, and osmotic phenomena.

MAMMALIAN PHYSIOLOGY

(Biological Sciences 414)

Spring. Credit six hours. Prerequisites, permission to register; courses in biochemistry, histology, and gross anatomy desirable. Lectures, M W F 8. Morrison 167. Laboratory, M or Th 1-5:30. Morrison 174. Discussion periods will be arranged for Saturday mornings. Professor Visek (in charge), Professors Gasteiger and Hansel, and Assistant Professor Reeves.

A general course in mammalian physiology including circulation, respiration, digestion, metabolism, renal function, endocrinology, and the nervous system.

CELLULAR PHYSIOLOGY, LECTURES

(Biological Sciences 511)

Fall. Credit three hours. Prerequisites, previous courses in animal or plant physiology and biochemistry desirable. Lectures, M W 11. Stimson G1. Assistant Professor Reeves.

An introduction to basic aspects of animal cell function including structural and functional organization of cells, permeability and active transport, trans-cellular secretion, ionic mechanisms underlying excitability phenomena in neurons and receptor cells, contractility, and bioluminescence.

CELLULAR PHYSIOLOGY, LABORATORY

(Biological Sciences 511a)

Fall. Credit two hours. Prerequisite, consent of the instructor. Enrollment is limited. Laboratory W or Th 1:40-4:30. Stimson 306. Assistant Professor Reeves and assistant.

The laboratory emphasizes a number of biophysical approaches to cellular activities.

EXPERIMENTAL ENDOCRINOLOGY

(Biological Sciences 513)

Spring. Credit two or three hours. Prerequisites, a year of zoology or its equivalent, organic chemistry, physiology, and consent of instructor. Primarily for graduate students, open to undergraduates for two credits. Lectures, M F 11. Stimson GI. Laboratory, M or F 2-4:30. Stimson 306. Professor Leonard.

Lectures on the anatomy and physiology of the vertebrate endocrine glands, glandular interrelationships, mechanism of hormone action, chemical and physiological properties of the hormones, assay methods. Laboratory includes small animal surgery, microtechnique for the endocrines, illustrative experiments on the effects of hormones.

FUNDAMENTALS OF ENDOCRINOLOGY

(Agriculture; Animal Husbandry 427)

Fall. Credit three hours. Prerequisite, a course in human or veterinary physiology or by permission. Lectures, T Th S 10. Morrison 167. Professor Hansel.

A general course in the physiology of the endocrine glands, and the roles played by each hormone in the regulation of normal body processes.

FUNDAMENTALS OF ENDOCRINOLOGY, LABORATORY

(Agriculture; Animal Husbandry 428)

Fall. Credit one hour. Registration by permission. Time to be arranged. Morrison 167. Professor Hansel.

The laboratory work consists of a series of projects designed to illustrate the basic principles of endocrinology and their applications to more efficient production in all classes of livestock.

PHYSIOLOGY

(Veterinary; Physiology 511)

Spring. Credit three hours. Prerequisites, Physiology 510, Anatomy 501 and 502, or Anatomy 900 or Biological Sciences 311 and 431. T Th S 8. Associate Professors Bergman, Dobson, Nangeroni, and Stevens.

Lectures and demonstrations on cellular physiology, muscle, nervous system, digestive system, urine secretion, and temperature regulation.

PHYSIOLOGY

(Veterinary; Physiology 610)

Fall. Credit three hours. Prerequisite, Physiology 511. T Th S 8. Professor Sellers and Associate Professor Bergman.

Lectures and demonstrations on blood, lymph, circulation, respiration, endocrine organs, and reproduction.

[EXPERIMENTAL PHYSIOLOGY FOR GRADUATE STUDENTS]

(Veterinary; Physiology 914)

Spring. Credit three hours. Given in alternate years. Prerequisites as for Physiology 511, co-registration in Physiology 511. Laboratory W F 1-4. Registration limited. Consent of instructor required. Associate Professor Nangeroni. Not offered in 1966.

SOCIAL STUDIES

[THE SOCIOLOGY OF WORK]

(*Agriculture; Rural Sociology 324*)

Fall. Credit three hours. Not open to freshmen or sophomores. Prerequisite, Rural Sociology 100 or equivalent. Lectures and discussions, M W F 9. Warren 232. Professor Taietz.

The following topics are covered: (1) the function of work for society and the individual, (2) bureaucratic structure and specialization, (3) the development of occupational norms and identifications, (4) occupational status, (5) the process of occupational selection, (6) dynamics of occupational change—horizontal and vertical mobility, (7) a case study of an occupation; trends in the professionalization of social work. Not offered in 1966.

RURAL COMMUNITY ORGANIZATION

(*Agriculture; Rural Sociology 411*)

Fall. Credit three hours. Prerequisite, Rural Sociology 100 or 210 or permission of the instructor. T Th 11–12:30. Warren 31. Associate Professor Reeder.

A consideration of the problems involved in helping people and organizations in a community work together to meet their common needs. There are two major emphases: (1) analysis of communities from the perspective of the community development worker as a change agent, (2) consideration of the problems which confront community development workers and the processes and methods by which they carry out their various community development tasks. Projects in nearby communities provide field laboratory experiences.

PEASANT SOCIETIES OF LATIN AMERICA

(*Agriculture; Rural Sociology 414*)

Spring. Credit three hours. T Th 2–3:30. Warren 201. Associate Professor Ellenbogen.

The unit of analysis is the community. A systematic analysis of selected types of peasant communities in Latin America focuses on the transition occurring in the systems of farming and land tenure arrangements, communication-transportation networks, institutional patterns and associational systems, and the orientations of norms and values. Consideration is also given to the linkages between the peasant community and national institutions and associations.

RESEARCH DESIGN

(*Agriculture; Rural Sociology 515*)

Fall. Credit three hours. Open to graduate students only. T Th 1:40–3. Warren 37. Associate Professor Harp.

Discussion of the relation of research design to theory and practice. Members of the seminar design research on problems of their own choosing.

CROSS-CULTURAL RESEARCH METHODS

(*Agriculture; Rural Sociology 516*)

Spring. Credit three hours. Prerequisite, Rural Sociology 515 or permission of the instructor. W F 1:40–3. Warren 201. Associate Professor F. W. Young.

Problems of adaptive methods to other cultural settings as well as the use of specifically cross-cultural procedures. Discussion of modifications of surveys,

key informant interviews, observation techniques, photography, case studies, and the exploitation of census and other available data. Special attention to comparisons based on the data of the Human Relations Area files. Consideration of designs, units of analysis, variables, and hypotheses relevant to problems of less developed countries.

APPLICATIONS OF SOCIOLOGY TO DEVELOPMENT PROGRAMS

(*Agriculture; Rural Sociology* 528)

Spring. Credit three hours. Open to graduate students only. M F 11-12:30. Warren 31. Professor Polson.

Application of sociological theory and methods to the problems of institutions and agencies concerned with rural development. Special emphasis is placed on programs for agricultural extension education and community development in low-income countries.

CULTURE AND PERSONALITY

(*Arts and Sciences; Anthropology* 265)¹

Fall. Credit three hours. M W F 11. Assistant Professor Wolf.

The study of the individual in his society emphasizing the relationship between social structure, cultural context, and human behavior. Attention is given largely to the study of personality, "normal" and "abnormal," in non-Western societies.

CULTURAL ANTHROPOLOGY

(*Arts and Sciences; Anthropology* 301)¹

Fall. Credit four hours. M W F 12. Professor Sharp.

¹ See the *Announcement of the College of Arts and Sciences* for additional offerings in this area.

In the diet clinic of the University Health Services selected students may obtain experience with patients.



A study and comparison of the types of learned, shared, and transmitted behavior patterns and ideas by means of which men of various periods and places have dealt with their environment, worked out their social relations with their fellow men, and defined their place in the cosmos. An inquiry into human nature and its expression in man's institutional and intellectual creations.

COMPARATIVE SOCIAL SYSTEMS

(*Arts and Sciences; Anthropology 314*)¹

Spring. Credit four hours. M W F 3. Professor Turner.

The topics dealt with include the comparative study of systems of kinship, politics, religion, and magic in preliterate societies and the relationship between these types of systems in particular societies. They will further include age and sex differentiations; age-sets and age-grades; division of labor, types of specialization, occupational associations; rank and occupation; social classes, caste, slavery, pawnship and serfdom; secret associations; social networks and social mobility. References will also be made to theories concerning the types of systems.

ETHNOLOGY OF NORTH AMERICA

(*Arts and Sciences; Anthropology 331*)¹

Fall. Credit four hours. Prerequisite, Anthropology 101 or 301, or consent of the instructor. M W F 3. Professor Roberts.

A general survey of the ethnography of North America, with emphasis on problems and topics to which the North American materials are most relevant. Selected cultures will be considered in some detail.

ETHNOLOGY OF MIDDLE AND SOUTH AMERICA

(*Arts and Sciences; Anthropology 332*)¹

Spring. Credit four hours. Prerequisite, Anthropology 101 or 301, or consent of instructor. M W F 9. Professor Holmberg.

A descriptive and analytical survey of contemporary native cultures of Middle and South America in terms of economic, social, political, and religious organizations. Representative groups from all cultural areas are considered, ranging from such marginal peoples as the Tierra del Fuegians to such complex civilizations as the Inca.

ETHNOLOGY OF SOUTHEAST ASIA AND OCEANIA

(*Arts and Sciences; Anthropology 334*)¹

Spring. Credit four hours. Prerequisite, Anthropology 101 or 301, or consent of instructor. T Th 2:30-4. Professor Sharp.

The development and distribution of major socioculture types in mainland and island Southeast Asia. Discussion of selected groups and of the fate of traditional cultural characteristics following the expansion of Chinese, Indian, Moslem, and Western civilizations into these areas.

ETHNOLOGY OF AFRICA

(*Arts and Sciences; Anthropology 337*)¹

Fall. Credit four hours. Prerequisite, Anthropology 101 or 301, or consent of the instructor. T Th S 9. Professor Turner.

A social and cultural survey of representative African peoples. Stress is laid on the comparative study of political institutions and local descent

¹See the *Announcement of the College of Arts and Sciences* for additional offerings in this area.

groups. Ritual beliefs and practices are considered in relation to repetitive and radical change.

CULTURE AND SOCIETY IN INDIA AND SOUTH ASIA

(*Arts and Sciences; Anthropology 341*)¹

Fall. Credit four hours. Prerequisite, Anthropology 101 or 301, or consent of instructor. M W F 10. Professor Opler.

A survey of the social, economic, political, and religious institutions of India and other countries of South Asia. Both the traditional cultures and the changes which are taking place are considered.

THEORY OF CULTURE CHANGE

(*Arts and Sciences; Anthropology 413*)¹

Fall. Credit four hours. Prerequisite, Anthropology 101 or 301, or consent of instructor. M W F 11. Professor Holmberg.

APPLIED ANTHROPOLOGY

(*Arts and Sciences; Anthropology 482*)¹

Spring. Credit four hours. Prerequisite, consent of instructor. M 2-4. Mr. Dobyns.

The principles of anthropology applied to planned programs of change. Designed not only for students of the humanities and different societies but also for natural scientists concerned with social and cultural problems involved in technological change, community development, native administration, and modernization in various regions of the world. The seminar is designed especially to prepare advanced undergraduate and graduate students for technical missions abroad.

RESEARCH

SPECIAL PROBLEM

(*School of Nutrition 199*)

Report of individual problem under the direction of any member of the faculty of the Graduate School of Nutrition. See page 19 for details.

¹ See the *Announcement of the College of Arts and Sciences* for additional offerings in this area.

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