The Bulletin of the UNIVERSITY *of* MINNESOTA

The College of Pharmacy Announcement for the Years 1947-1949

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UNIVERSITY CALENDAR, 1947-48

Fall Quarter

1947

August 1 - September 26			Entrance Tests.[1] Fall Registration[2]: Dates for the various colleges will be announced in the press and in mailed instructions. Students who can do so are urged to register early. It is expected that all students who can do so will register before September 1
September	15	Monday	Extension registration, first semester, begins
September	18	Thursday	Fall quarter fees due for students registered through September 11
September	22-26		New student week; program of orientation. Details will be announced in instructions issued at registration. All new students are expected to attend
September	26	Friday	Last day for registration[2] and payment of fees for the undergraduate colleges
September	29	Monday	Fall quarter classes begin 8:00 a.m.[3] First semester extension classes begin[4]
October	2	Thursday	Opening convocation, 11:00 a.m.
October	4	Saturday	Last day for extension registration and for registration and payment of fees for the Graudate School, and for teachers in service
October	13	Monday	(Sunday, October 12, Columbus Day); holiday (except extension)
November	1	Saturday	Dads Day
November	8	Saturday	Homecoming Day
November	11	Tuesday	Armistice Day; holiday (except extension)
November	13	Thursday	Senate meeting, 4:00 p.m.
November	27	Thursday	Thanksgiving Day; holiday
December 12-13 and 15-18			Final examination period
December	18	Thursday	Fall quarter ends 6:00 p.m.[5]; Commencement, 8:00 p.m.

Winter Quarter

December	26	Friday	Winter quarter fees due for students in residence fall quarter in undergraduate colleges
1948			
January	2	Friday	Entrance tests[1]
January	2-3		Registration[2] in all colleges for new students not already registered. Registration and payment of fees for new students in all undergraduate colleges closes at noon, Saturday, January 3
January	5	Monday	Winter quarter classes begin 8:00 a.m.[3] Extension classes resume
January	10	Saturday	Last day for registration and payment of fees for the Graduate School, and for teachers in service
January	26	Monday	Second semester extension registration begins
February	7	Saturday	First semester extension classes close

See page 3 for footnotes.

February	9	Monday	Second semester extension classes begin[4]
February	12	Thursday	Lincoln's Birthday; holiday (except extension)
February	14	Saturday	Last day for extension registration
February	19	Thursday	Charter Day Convocation, 11:00 a.m.; Senate meeting, 4:00 p.m.
February	23	Monday	(Sunday, February 22, Washington's Birthday); holiday (except extension)
March 12-13 and 15-18			Final examination period
March	18	Thursday	Spring quarter fees due for students in residence winter quarter in undergraduate colleges. Winter quarter ends 6:00 p.m.; Commencement, 8:00 p.m.

Spring Quarter

March	26	Friday	Good Friday; holiday (except extension)
March	27	Saturday	Entrance tests[1]; Registration[2] for new students not already registered Registration and payment of fees for new students in all undergraduate colleges closes at 4:00 p.m.
March	29	Monday	Spring quarter classes begin 8:00 a.m.[3]
April	3	Saturday	Last day for registration and payment of fees for the Graduate School, and for teachers in service
May	8	Saturday	Mothers Day
May	13	Thursday	Cap and Gown Day Convocation, 11:00 a.m.; Senate meeting, 4:00 p.m.
May	31	Monday	(Sunday, May 30, Memorial Day); holiday (except extension)
June	4	Friday	Second semester extension classes close
June	6	Sunday	Baccalaureate service
June	7-12		Final examination period
June	12	Saturday	Spring quarter ends 6:00 p.m.; Seventy-sixth annual commencement, 8:00 p.m.

Summer Session

June	15	Tuesday	Registration[2] for new students not already registered. First term fees due for students in all colleges
June	16	Wednesday	First term Summer Session classes begin 8:00 a.m.[3]
July	5	Monday	(Sunday, July 4, Independence Day); holiday
July	23	Friday	First term closes
July	26	Monday	Registration[2] for new students not already registered. Second term fees due for students in all colleges
July	27	Tuesday	Second term classes begin 8:00 a.m.[3]
August	26	Thursday	Summer commencement, 8:00 p.m.
August	28	Saturday	Second term closes

[1] Applicants are urged to take entrance tests one to two months in advance of the quarter for which admission is desired. Tests may be taken at the Student Counseling Bureau, 101 Eddy Hall.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See privilege fees for late registration or late payment of fees, page 36 in *General Information Bulletin.*

[3] First hour classes begin at 7:45 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

[5] Extension classes end Friday, December 19, and resume Monday, January 5.

ADMINISTRATIVE OFFICERS

James L. Morrill, B.A., LL.D., President
Charles H. Rogers, D.Sc., Dean of the College of Pharmacy and Professor of Pharmaceutical Chemistry
Malcolm M. Willey, Ph.D., Vice President, Academic Administration
William T. Middlebrook, B.A., M.C.S., Vice President, Business Administration
Anne D. Blitz, M.A., LL.D., Dean of Women
Ruth E. Boynton, M.S., M.D., Director of Students' Health Service
True E. Pettengill, M.S., Recorder
Edmund G. Williamson, Ph.D., Dean of Students
Robert E. Summers, M.S., M.E., Dean of Admissions and Records

GENERAL INFORMATION

COURSES OF STUDY

At the beginning of the fall quarter, 1944-45, the course in Pharmacy was decelerated for all classes. Therefore the College of Pharmacy is again offering one undergraduate course of four academic years leading to the degree bachelor of science in pharmacy (B.S. in Phm.)

The College of Pharmacy and the School of Business Administration offer an optional combined course in Pharmacy and Business Administration leading to the degree bachelor of science in pharmacy (B.S. in Phm.) and bachelor of business administration (B.B.A.). This optional course is open only to those students who register in the College of Pharmacy either with or without advanced standing and who can present evidence of better than average ability. Students who are permitted to register for this course of study must take the professional and business administration courses in the sequences in which they are offered. See page 15.

Graduate study with major work in pharmaceutical chemistry and pharmacognosy, leading to the degrees of master of science (M.S.) and doctor of philosophy (Ph.D.) respectively, is offered by the Graduate School. Graduate work with a major in pharmaceutical chemistry or pharmacognosy is open to those students who have shown exceptional scholarship and ability in the undergraduate course of this or some other college of pharmacy of equal standing. Consideration will be given to the applications of those students who are not graduates in pharmacy but whose pattern of undergraduate work includes training in such allied or related subjects as would implement them to pursue work successfully at the graduate level with a major in pharmaceutical chemistry or pharmacognosy. Detailed information on graduate courses in pharmaceutical chemistry and pharmacognosy is contained in the *Bulletin of the Graduate School* which may be obtained from the office of the Graduate School, University of Minnesota.

ADMISSION BY CERTIFICATE

Diplomas or other evidences of the completion of an accredited four-year high school course, or of its educational equivalent, are required for admission. For details concerning the requirements for admission, consult the *Bulletin of General Information.*

ADMISSION BY EXAMINATION

Students who do not meet the requirements for admission by certificate may qualify for admission on the basis of entrance tests as described in the *Bulletin of General Information.*

ADMISSION TO THE PROFESSIONAL WORK OF THE SOPHOMORE YEAR IN PHARMACY

In order to maintain instruction at the necessary professional level, the existing educational emergency has made it imperative to restrict admissions to the sophomore year in the College of Pharmacy. Students interested in entering the sophomore year of this college at the beginning of any fall quarter, should apply for admission not later than May 15 of the corresponding year. Applications should be accompanied by an official transcript of the student's record up to the date upon which the application is filed. These applications will be reviewed subsequent to that date and those accepted will be notified on or before August 1. All applicants with honor point ratios of 1.5 (C+) or above, meeting all prerequisites will be assured of admission to the sophomore year. Those students with less than 1.5 (C+) will be considered individually. Those found ineligible will be notified as soon as possible after May 15 with the expectation that all will be advised not later than August 1.

Students who will have completed only two quarters of work by the end of the spring quarter and who expect to complete their work in the following summer session, should apply prior to May 15 for admission to the sophomore class beginning the fall quarter. In such cases final action upon their applications will be deferred pending examination of the quality of their summer session work.

Application forms for pharmacy freshmen at Minnesota may be obtained at the college office (WuH 101). Other students in the University may obtain forms for change of college at window 16, Office of Admissions and Records. Students enrolled under the joint registration plan or those requesting admission with advanced standing from other institutions may obtain the necessary application forms from the Office of Admissions and Records, University of Minnesota, Minneapolis 14.*

PROSPECTIVE STUDENTS

During the postwar emergency in veterans' education, certain restrictions apply of necessity to consideration of persons resident outside of Minnesota. For current information regarding the ruling on nonresidents see the *General Information Bulletin* of the University, or write to the Office of Admissions and Records.

All applicants for admission, either with or without advanced standing, should request the high schools or colleges they attended to send complete transcripts of their records to the Office of Admissions and Records of the University as soon as possible. A student's credentials will not be reviewed unless a completed official application form (obtained from the Office of Admissions and Records) has been filed by him with the Office of Admissions and Records. The submitting of an Application for Admission form does not obligate a student to enroll in the University. As soon as an applicant's official transcript has been reviewed, he will be notified of his admission status and directions for registration will be sent to him.

It is recommended that those students who are still in high school and who contemplate making application for admission to the College of Pharmacy upon their graduation, include in their high school courses, higher algebra, solid geometry, botany, chemistry, physics, and physiology.

Students who have graduated from high school and wish to complete the first year of the pharmacy curriculum at another college or university and enter here upon the professional pharmaceutical work of the sophomore year should arrange their programs

* NOTE: It is the responsibility of these students to submit to the Office of Admissions and Records complete official transcripts, indicating honorable dismissal, at the conclusion of all preparatory work at any other school or college. Final action on each such admission will be deferred pending receipt of this material.

so as to include all subjects listed in the first year of the curriculum on page 11. See Admission to the Professional Work of the Sophomore Year in Pharmacy, page 5.

A review of the pharmacy curriculum will show it to be comprised of 204 credit hours of work in professional, scientific, and business administration courses (most of it required) of which approximately 50 per cent is laboratory instruction. It follows that if a student is to do creditably in his studies, he is precluded from engaging in outside work which will interfere with his application and study both in and out of school. A student who finds it necessary to wholly or partially support himself is advised to take five years or more to complete the work of the four-year course. Arrangements to do this can be made with the dean or chairman of the Students' Work Committee.

THOSE WITH ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies at an accredited institution, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge.

ADULT SPECIAL STUDENTS

Persons of mature age and experience (generally 24 years of age or older) who desire a specific and limited course of study and who are not at present candidates for an undergraduate degree, or persons who hold Bachelor degrees, may, upon approval of the dean of the college concerned, be admitted as adult special students. An adult special student may not become a candidate for a degree without the approval of his college, nor will advanced standing be allowed while the student is in the adult special classification. Applicants as adult specials are subject to the ruling on residency. Registered pharmacists who desire to pursue the work of any one or more of the courses offered in the curriculum may do so with the approval of the dean.

EXAMINATIONS AND STANDING

Examinations are held during the last week of each quarter, and are supplementary to the written and practical tests that are held at frequent intervals during the year and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A, highest, D, lowest passing mark), I (Incomplete), and F (Failure). The grade of I (Incomplete) is a temporary grade indicating that a student has a satisfactory record in work completed and, for justifiable reasons satisfactory to the instructor in charge, was unable to complete the work of the course. Any student receiving this grade is required to complete the work of the course within the first thirty days of his next quarter in residence. A grade of I (Incomplete) which is not removed within the first thirty days of the student's next quarter in residence will be marked cancelled without grade. An extension of time may be permitted for removal of incomplete grades upon recommendation of the instructor concerned and approval of the Students' Work Committee of the college in which the student is registered. If a petition is presented after the end of the thirty-day period, a restoration of the mark of incomplete may be permitted by the Students' Work Committee of the college concerned upon the recommendation of the instructor but would be considered in the nature of a special examination for which a fee of $5 is required.

Absences will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarships may subject the student to probation or temporary or permanent suspension.

FEES AND EXPENSES

For a detailed statement of fees and expenses, see *Bulletin of General Information.*

GRADUATION REQUIREMENTS

Beginning with the entering class of 1945-46, a "C" average will be a requirement for graduation.

In order to become a candidate for a degree, a student must be of good moral character and must have completed the work of the senior year in residence.

PHARMACY LAW REQUIREMENTS

Section 10 of the pharmacy laws of the State of Minnesota, as amended by the Legislature on March 28, 1941, reads as follows:

To be entitled to examination by the State Board of Pharmacy as a pharmacist, the applicant shall be a citizen of the United States, of good moral character, at least twenty-one years of age, and shall be a graduate of the College of Pharmacy of the University of Minnesota or of a college or school of pharmacy in good standing, of which the Board shall be the judge, and shall have at least one year of practical experience in a pharmacy.

On July 18, 1941, the Minnesota State Board of Pharmacy issued the following regulation on above passage:

Only graduates of the College of Pharmacy of the University of Minnesota and graduates of other schools and colleges of pharmacy accredited by the American Council on Pharmaceutical Education will be eligible for licensure examination.

The College of Pharmacy of the University of Minnesota is not only specifically named in the law but it is also accredited by the American Council on Pharmaceutical Education.

In January, 1940, the Minnesota State Board of Pharmacy issued a regulation to the effect that an official or certified transcript of scholastic work must accompany the application for examination for licensure to practice pharmacy in this state. Transcripts of Minnesota graduates may be obtained from the Office of Admissions and Records of the University. Requests for transcripts should be made not later than ten days prior to the date upon which the application is to be filed with the Board of Pharmacy. No person will be charged for the transcript unless three transcripts have been issued previously to him. A fee of 50 cents will then be charged.

In order that practical experience obtained as an apprentice during summer vacations may be credited toward the year of practical experience required by law, a student must file two statements with the Board of Pharmacy, one form showing the date such apprentice began his experience, and another showing the date on which it ended, this regardless of the length of time employed. These forms may be obtained from the Secretary of the State Board of Pharmacy. A complete file of those registered pharmacists who have signified their willingness to serve as preceptors is available in the office of the dean.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the college at least twice each year to examine candidates for registration. For information concerning all matters coming under the jurisdiction of the State Board, address Secretary of the State Board of Pharmacy, 3965 Minnehaha Avenue South, Minneapolis 6, Minnesota.

MEDICINAL PLANT LABORATORY AND GARDEN

The facilities of the medicinal plant garden, plant laboratory, and conservatory afford opportunity for instruction in methods of cultivating, collecting, preparing, drying, and milling many official and nonofficial drugs. Approximately five hundred species of plants of medicinal and economic importance grown in the garden and greenhouses provide

ample and varied material for study of the gross anatomical, histological, and chemical characteristics of these plants, for the preparation of herbarium specimens, for research in medicinal plant cultivation, etc.

DISPENSARY PRESCRIPTION PRACTICE

Actual experience in compounding and dispensing is obtained in the pharmacy of the University of Minnesota Hospitals where, under supervision, the students compound prescriptions written by the physicians in the University of Minnesota Hospitals, Out-patient Department, and Students' Health Service. During 1946 approximately one hundred twenty-seven thousand prescriptions were compounded.

SPECIAL LECTURES

From time to time throughout the school year, outstanding men in the fields of pharmacy and related sciences address the students of the College of Pharmacy. Students are required to attend.

MELENDY MEMORIAL LECTURES

Annually some pharmacist of national reputation delivers a lecture at the College of Pharmacy on a subject intended to advance the interests of the profession. This lectureship has been made possible by the Samuel W. Melendy Memorial Fund.

PHARMACEUTICAL EDUCATIONAL TRIP

Once during the academic year, usually during the spring vacation, an opportunity is afforded students in the College of Pharmacy to visit the laboratories of at least one pharmaceutical and/or biological manufacturer. Students are urged to make at least one of these trips at some time during their four years in college.

ELECTIVES IN OTHER COLLEGES OF THE UNIVERSITY

All of the facilities of the University are open to students of this college. Therefore, students having the necessary prerequisites may elect subjects in other colleges of the University, if such election does not interfere with the required work in the College of Pharmacy. Subjects elected must be approved by the dean.

TEXTBOOKS

Textbooks used in all courses may be obtained after coming to the University.

SCHOLARSHIPS, FELLOWSHIPS, AND PRIZES

Scholarships*

Open to veterans† and undergraduate students regularly enrolled in the College of Pharmacy.

One $225 Minnesota State Pharmaceutical Association Scholarship and a token awarded to that student who is a citizen of the United States and who has earned the highest general average rating at the completion of the first two years of professional pharmaceutical work up to ten days before Cap and Gown Day and who intends to become a candidate for the degree B.S. in Pharmacy from this college. If the student receiving this award should fail to return to the college the following year to complete his senior work, the said sum will be awarded to the student next highest in standing who also meets the other requirements.

Three $200 Samuel W. Melendy Scholarships are available to sophomore students in the College of Pharmacy.

* Applications for scholarships should be made to the dean of the College of Pharmacy.

† Awards to veterans will be based upon their scholarship during the last year they were in attendance before entering the service.

Three $200 Samuel W. Melendy Scholarships are available to junior students.

Three $200 Samuel W. Melendy Scholarships are available to senior students.

The bases upon which these scholarships are awarded are: (1) outstanding scholarship in academic and professional courses of study of the preceding year; and (2) character, personality, and general outstanding qualities of leadership.

One $740 William S. Merrell Company Scholarship through the American Foundation for Pharmaceutical Education. To be used for tuition, fees, and books for four school years or equivalent, ($740 or $185 per year). Any student to whom this scholarship has been awarded must maintain an average of "C" or better or further support from this fund for such student will be withdrawn.

It is anticipated that several $200 American Foundation for Pharmaceutical Education Scholarships will be available each school year.

Fellowships§

Open to graduate students with majors in pharmaceutical chemistry or pharmacognosy in the College of Pharmacy, University of Minnesota.

One $500 Minnesota State Pharmaceutical Association Fellowship, with exemption from tuition, open to sufficiently qualified graduates of the College of Pharmacy of the University of Minnesota.

Three $1,000 Samuel W. Melendy Memorial Fellowships, without exemption from tuition, to be offered annually. The major study must be in pharmaceutical chemistry or pharmacognosy and full time devoted to graduate study and researches.

Three $1,000 Lederle Laboratories, Inc., Fellowships, without exemption from tuition, to be offered annually. The major study must be in pharmaceutical chemistry and full time devoted to graduate study and research.

A $1,000 fellowship, without tuition exemption, in organic pharmaceutical chemistry has been established by Parke-Davis Company of Detroit, Michigan.

Two $1,000 Eli Lilly and Company Fellowships, without tuition exemption, in organic pharmaceutical chemistry have been established.

Graduate fellowships have been made available by the American Foundation for Pharmaceutical Education to graduate students majoring in pharmaceutical subjects. Applications for such fellowships should be made directly to the American Foundation for Pharmaceutical Education, 330 West 42nd Street, New York City.

Prizes

Kappa Epsilon Prize

The Alumnae Chapter of Kappa Epsilon, national pharmacy sorority, offers the interest on $425 as a prize to the Kappa Epsilon student who has earned the highest scholastic average at the end of four years. The sum is to be used to defray the expenses of the State Board examination and registration.

Lehn and Fink Gold Medal

Lehn and Fink Products Corporation, of New York City, awards annually a gold medal to that student in the College of Pharmacy who graduates with the degree B.S. in Pharmacy and who has earned the highest general average rating during the four years of undergraduate study.

Wulling Club Key

The Wulling Club of the College of Pharmacy awards annually an appropriate gold key to that student in the College of Pharmacy who graduates with the degree B.S. in

§ Applications for fellowships should be made to the office of Graduate School and applications for scholarships should be made to the dean of the College of Pharmacy.

Pharmacy and who has earned the second highest general average rating during the four years of undergraduate study.

Rho Chi Award

Mu Chapter of the Rho Chi Society, a national honorary pharmacy organization, annually presents to the highest ranking sophomore student a membership for one year in the American Pharmaceutical Association. This includes a one-year subscription to the *Journal of the American Pharmaceutical Association.*

COMMUNICATIONS

Communications relating to registration or advanced standing should be addressed to the Board of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota. Official transcripts for advanced standing will be evaluated by the Office of Admissions and Records only when accompanied by a completed Application for Admission form. All other inquiries should be addressed to Dean Charles H. Rogers, College of Pharmacy, University of Minnesota, Minneapolis 14, Minnesota.

COURSES OF STUDY

The College of Pharmacy offers one four-year course in Pharmacy and one optional combined course in Pharmacy and Business Administration.

The Graduate School offers courses in pharmaceutical chemistry and pharmacognosy. (See *Bulletin of the Graduate School.*)

FOUR-YEAR COURSE

The College of Pharmacy offers one undergraduate course of four years' duration leading to the degree bachelor of science in pharmacy. This course includes one year of work in certain subjects in the College of Science, Literature, and the Arts, or other college of equal standing.

CURRICULUM

FOUR-YEAR COURSE

First Year

SUMMARY OF CLOCK HOURS AND QUARTER CREDIT HOURS

Course	Didactic	Laboratory	Total	Credit Hours
First Quarter (12 weeks)				
Pharmacy 1f	24	.....	24	2
General Inorganic Chemistry 6f	36	72	108	5
Composition 4f	36	.....	36	3
Botany 1f†	24	48	72	3
Total	120	120	240	13
Second Quarter (11 weeks)				
General Inorganic Chemistry 7w	33	66	99	5
Composition 5w	33	.....	33	3
Mathematics 1 or 6w*	55	.....	55	5
Botany 2w†	22	44	66	3
Total	143	110	253	16
Third Quarter (11 weeks)				
Semimicro Qualitative Analysis 12s	33	66	99	5
Composition 6s	33	.....	33	3
Mathematics 6 or elective*	55	.....	55	5
Public Health 3s	22	.....	22	2
Total	143	66	209	15
Total for first year	406	296	702	44

* A student who has completed one year of higher algebra in high school may: (1) substitute a 5-credit course in college algebra or some other 5-credit course having the approval of the Students' Work Committee; or (2) substitute Mathematics 15 and 16 for college algebra and trigonometry or for trigonometry and an elective.

† A student who is pursuing the first year of the pharmacy curriculum at some accredited institution other than the University of Minnesota, must present a minimum of six quarter-credit hours of botany to meet this requirement.

Second Year

SUMMARY OF CLOCK HOURS AND QUARTER CREDIT HOURS

Course	Didactic	Laboratory	Total	Credit Hours
First Quarter (12 weeks)				
Pharmacy 1f*	.....	.....	.....	.....
Pharmacy 2f	12	.....	12	1
Pharmaceutical Chemistry 1f	24	72	96	4
Pharmacognosy 1f	12	36	48	2
Zoology 14f	24	48	72	3
Physics 1af	36	24	60	4
Total	108	180	288	14
Second Quarter (11 weeks)				
Pharmaceutical Chemistry 2w	22	66	88	4
Pharmacognosy 2w	11	33	44	2
Zoology 15w	22	44	66	3
Physics 2aw	33	22	55	4
Organic Chemistry 61w	55	44	99	4
Total	143	209	352	17
Third Quarter (11 weeks)				
Pharmacy 3s	33	33	66	4
Pharmacognosy 3s	22	33	55	3
Physics 3as	33	22	55	4
Organic Chemistry 62s	55	44	99	4
Physiology 4s	44	.....	44	4
Total	187	132	319	19
Total for second year	438	521	959	50

* Students who have completed the work of the first year with the exception of Pharmacy 1f (2 cred.) must take this course concurrently with their sophomore work.

Third Year

SUMMARY OF CLOCK HOURS AND QUARTER CREDIT HOURS

Course	Didactic	Laboratory	Total	Credit Hours
First Quarter (12 weeks)				
Pharmacy 54f	36	72	108	5
Pharmaceutical Chemistry 161f	36	.....	36	3
Pharmacognosy 54f	24	36	60	3
Pharmacognosy 55f	36	.....	36	3
Pharmacy 57f	12	.....	12	1
Economics 10f	36	.....	36	3
Total	180	108	288	18
Second Quarter (11 weeks)				
Pharmacy 55w	33	66	99	5
Pharmaceutical Chemistry 162w	33	.....	33	3
Pharmacognosy 56w	33	.....	33	3
Economics 30w	33	.....	33	3
Bacteriology 53w	33	66	99	5
Total	165	132	297	19
Third Quarter (11 weeks)				
Pharmacy 56s	33	66	99	5
Pharmaceutical Chemistry 163s	33	.....	33	3
Pharmacognosy 57s	33	.....	33	3
Pharmacognosy 58s	.....	.....	.....	.....
Business Administration 67s	33	.....	33	3
Pharmaceutical Chemistry 53s	33	33	66	4
Total	165	99	264	18
Total for third year	510	339	849	55

Fourth Year

SUMMARY OF CLOCK HOURS AND QUARTER CREDIT HOURS

Course	Didactic	Laboratory	Total	Credit Hours
First Quarter (12 weeks)				
Pharmacy 58f	36	72	108	5
Pharmacy 61f*	.....	8	8	.....
Pharmacy 70f	24	.....	24	1
Pharmaceutical Chemistry 54f	24	72	96	4
Pharmacognosy 59f	36	.....	36	3
Pharmacology 2f†	36	.....	36	3
Public Health 51f	36	.....	36	3
Total	192	152	344	19
Second Quarter (11 weeks)				
Pharmacy 59w	22	66	88	4
Pharmacy 62w	.....	8	8	.....
Pharmacy 64w	22	.....	22	2
Pharmacy 65w	11	33	44	2
Pharmaceutical Chemistry 55w	22	66	88	4
Pharmacology 3w†	33	66	99	5
Professional electives§	11	66	77	3
Total	121	305	426	20
Third Quarter (11 weeks)				
Pharmacy 60s	22	66	88	4
Pharmacy 63s	.....	8	8	1
Pharmacy 71s	33	.....	33	3
Pharmaceutical Chemistry 56s	33	66	99	5
Professional electives§	11	66	77	3
Total	99	206	305	16
Total for fourth year	412	663	1,075	55
Grand total	1,766	1,819	3,585	204

* One credit for three quarters' work.

† Subject to change.

§ Professional electives:

Pharmacy 66w-67s (Industrial Manufacturing Pharmacy)—6 cred.
Pharmacy 68w-69s (Hospital Pharmacy)—6 cred.
Pharm. Chem. 164w-165s (Special Analytical Methods)—6 cred.
Pharmacog. 60w-61s (Pharmacognosy and Pharmaco-Histology)—6 cred.
Pharmacog. 162w (Biological Assay of Drugs)—3 cred. (Students who elect either biological assay of drugs or veterinary products as their professional elective for the winter quarter, must take insecticides and fungicides for their spring quarter professional elective.)
Pharmacog. 164s (Insecticides and Fungicides)—3 cred.
Pharmacy 72w (Veterinary Products)—3 cred. (Students who elect either biological assay of drugs or veterinary products as their professional elective for the winter quarter, must take insecticides and fungicides for their spring quarter professional elective.)
Elementary Organic Chemistry 63s, 64s—5 cred. (See pages 18 and 21.)
No credit will be given for a professional elective until the work of two quarters in the same elective is completed.

OPTIONAL COMBINED COURSE IN PHARMACY AND BUSINESS ADMINISTRATION

The College of Pharmacy and the School of Business Administration offer an optional combined course in Pharmacy and Business Administration leading to the degrees bachelor of science in pharmacy and bachelor of business administration. This optional course is open only to those students who register in the College of Pharmacy either with or without advanced standing and who can present evidence of better than average ability.

Requirements for these degrees are: (1) the completion of all courses, except Economics 10 and 30 listed in the four-year course in Pharmacy; and (2) completion of the following courses in Business Administration:

	Credits
Economics 8-9 (General Economics)	6
Economics 28 (Business Law)	3
Economics 20 (Elements of Accounting)	3
Economics 25 (Principles of Accounting)	3
Economics 149 (Business Cycles)	3
Economics 161 (Labor Problems and Trade Unionism)	3
B.A. 58 (Elements of Public Finance)	3
B.A. 70 (Statistics Survey)	3
B.A. 89 (Production Management)	3
B.A. 77 (Survey in Marketing)	3
B.A. 67 (Retail Store Management for Pharmacy Students)	3
B.A. 130 (Cost Accounting Survey)	3
B.A. 112 (Business Statistics)	3
B.A. 88 (Advertising)	3
B.A. 155 (Corporation Finance)	3
B.A. 180-181-182C (Senior Topics: Marketing)	9
B.A. 101-102 (Advanced General Economics)	6
B.A. 142 (Advanced Money and Banking)	3
Total five years	66

If the professional and administration courses are taken concurrently, it is estimated that between five and six academic years will be necessary to meet the requirements for both of these degrees. There is the possibility that by taking business administration courses during the summer sessions, the time necessary to meet the requirements for these degrees could be reduced to the minimum (five years).

DESCRIPTION OF COURSES

Courses Offered in the College of Pharmacy

Following each course is a statement in parentheses of credits, classes of students eligible, and prerequisites. Thus (3 cred.; sr.; prereq. Pharm. 56s) means the course carries three credits, is open to seniors, and that Pharmacy 56s is a prerequisite.

PHARMACY

Professors Charles V. Netz, Ph.D., Head, Charles H. Rogers, D.Sc.; Associate Professor Willard J. Hadley, Ph.D.; Assistant Professor Rugnar Almin, B.S. in Phm.; Chief Pharmacist Hallie Bruce, Phm.G.; Special Lecturers Richard H. Bachelder, LL.B., John R. Hartmann; Teaching Assistants Raymond A. Hopponen, B.S. in Phm., Harrison Williams, B.S. in Phm.; Student-Pharmacist Supervisor Stewart Brokaw, B.S. in Phm.

1f. Orientation. A general survey of the field of pharmacy and related sciences including a cursory description of the courses offered in the pharmacy curriculum. The accomplishments and aims of some of the state and national pharmaceutical, medical, and chemical organizations are presented. (2 cred.; fr., soph.; no prereq.) Mr. Rogers.

2f. Pharmaceutical Latin. A study of those Latin and latinized words and constructions commonly encountered in pharmaceutical practice. (1 cred.; soph.; no prereq.) Mr. Almin.

3s. Pharmaceutical Calculations. A study of weights and measures; thermometry and calorimetry; specific gravity; calculations of doses; and percentage and stock solutions. Laboratory exercises emphasize practical application of the basic principles involved and acquaint the student with fundamental pharmaceutical techniques. (4 cred.; soph.) Mr. Netz and assistants.

54f-55w-56s. Pharmaceutical Preparations. A study of some official and unofficial preparations. In general, the distribution of preparations through the three quarters will be as follows:

Pharm. 54f—Aromatic waters, infusions, decoctions, syrups, solutions, injections, lotions, magmas, mixtures.

Pharm. 55w—Spirits, tinctures, fluidextracts, extracts, powders, mucilages, glycerites, liniments, collodions, sprays, suppositories.

Pharm. 56s—Resins, oleoresins, elixirs, soaps, plasters, ointments, cerates, effervescent salts, masses, pills, emulsions, dental preparations. (15 cred.; prereq. Pharm. 2f, Pharm. 3s, Pharm. Chem. 1f,2w.) Mr. Hadley, Mr. Almin, and assistants.

57f. History of Pharmacy. A study of the development of pharmacy from 1500 B.C. to the present time, including the development of pharmaceutical literature, education, legislation, and organizations. (1 cred.; jr.; no prereq.) Mr. Netz.

58f-59w-60s. Prescription Compounding. A critical study of the prescription and the application of techniques involved in compounding and dispensing a wide range of prescriptions written in actual medical practice. Special attention is given to incompatibilities. (13 cred.; sr.; prereq. Pharm. Chem. 2w, Pharmacog. 57s, Pharm. 56s. Pharm. Chem. 163s.) Mr. Netz, Mr. Almin, Mr. Hadley, and assistants.

61f-62w-63s. Dispensary Prescription Practice. Practical experience in prescription compounding is received in the pharmacy of the University of Minnesota Hospitals where the students, under supervision, compound prescriptions written by staff physicians. These courses run concurrently with Pharm. 58f-59w-60s, respectively. (1 cred.; sr.; prereq. same as for Pharm. 58f.) Miss Bruce and assistants.

64w. Pharmaceutical Jurisprudence. Fundamental principles of law and legal procedure, legal duties, and public responsibilities of the retail pharmacist; analysis of federal and Minnesota State Laws and regulations affecting the practice of pharmacy; and a discussion of a select group of common legal problems of practical importance to the pharmacist. (2 cred.; sr.; no prereq.) Mr. Bachelder.

65w. Cosmetics. A study of the composition and methods of manufacture of powders, creams, lotions, soaps, and other cosmetic products. (2 cred.; sr.; prereq. Org. Chem. 2, Pharm. 56s.) Mr. Netz and assistants.

66w-67s. Industrial Manufacturing Pharmacy. This course deals with typical problems incident to the production of pharmaceutical preparations on an industrial scale. Laboratory work includes manufacture, coating and polishing of pills and compressed tablets, milling of ointments, preparation of granulations, solutions, fluidextracts, etc. Registration in this course is limited to available instructional facilities. Professional elective. (6 cred.; sr.; prereq. Pharm. 56s.) Mr. Almin and assistants.

68w-69s. Hospital Pharmacy. Special pharmaceutical training for those who expect to practice in a hospital pharmacy. It includes a study of hospital administration and procedure, instruction in purchasing supplies (drugs, rubber goods, surgical supplies, etc.), stock control, records, manufacture of pharmaceutical preparations, prescriptions, and the preparation of parenteral solutions and allergens. Registration in this course is limited to available instructional facilities. Professional elective. (6 cred.; sr.; prereq. Pharm. 58f, 61f.) Miss Bruce and assistants.

At the conclusion of the spring quarter, students who have completed the course in Hospital Pharmacy are offered the opportunity to acquire an additional two weeks' full-time training in the dispensary of the University Hospitals. No fee will be charged for this extra instruction, neither will there be any financial remuneration nor scholastic credit given for it.

70f. First Aid. The standard American Red Cross First Aid course. (1 cred.; sr.; no prereq.) Mr. Hartmann.

71s. New Pharmaceutical Specialties. A consideration of many new drugs and medicinal preparations as they are introduced to the medical profession. The lectures are given by representatives of pharmaceutical manufacturers. (3 cred.; sr.; prereq. Pharm. Chem. 163s.) Mr. Soine.

72w. Veterinary Products. The chemical, pharmaceutical, and pharmacological study of recognized therapeutic agents used in the prevention and treatment of disease in domestic animals and poultry. Professional elective. Students who elect this course as their professional elective for the winter quarter must take Pharmacog. 164s, (Insecticides and Fungicides) for their spring quarter professional elective. (3 cred. sr.; prereq. Pharm. 56s.) Mr. Hadley.

PHARMACEUTICAL CHEMISTRY

Professors Ole Gisvold, Ph.D., Head, Charles H. Rogers, D.Sc.; Associate Professors Charles O. Wilson, Ph.D.; Taito O. Soine, Ph.D.; Teaching Assistants John Kleber, M.S., Myron Buchdahl, B.S. in Phm., John Schermerhorn, B.S. in Phm., Doris Shelley, B.S. in Phm.; Student-Pharmacist Supervisor Henry Sperling, B.S. in Phm.

1f-2w. Inorganic Pharmaceutical Products. The histories, sources, methods of manufacture, common impurities, formation in pharmaceutical preparations, properties, characteristic reactions, and uses of the inorganic chemicals employed in pharmacy are studied in this course. The laboratory work includes the preparation and purification

of typical inorganic compounds of special pharmaceutical interest. (8 cred.; soph.; prereq. Semimicro Qualitative Analysis 12 or any standard 5-credit course in qualitative chemical analysis.) Mr. Soine and assistants.

53s. Pharmaceutical Biochemistry. A study of the constituents of normal and pathological urine; a consideration of some of the therapeutic agents excreted by the kidney; also a consideration of the normal constituents of the blood and the effect of pathological conditions upon these constituents. Laboratory work includes qualitative and quantitative tests for albumin, sugar, acetone, acetoacetic acid, hemoglobin, etc., in urine, the determination of erythrocyte and leucocyte counts, the typing of blood, and other clinical determinations. (4 cred.; sr.; prereq. Pharm. Chem. 55w.) Mr. Fischer, Mr. Wilson, and assistants.

54f. Quantitative Pharmaceutical Chemistry. A didactic and laboratory course consisting of the fundamental principles, methods, and procedures of gravimetric analysis as applied to the analyses of inorganic pharmaceutical products. (4 cred.; sr.; prereq. Semimicro Qualitative Analysis 12 and Org. Chem. 2.) Mr. Wilson and assistants.

55w. Quantitative Pharmaceutical Chemistry. A didactic and laboratory course dealing with the fundamental principles, methods, and procedures of volumetric analysis as applied to the analyses of inorganic and organic pharmaceutical products. (4 cred.; sr.; prereq. Pharm. Chem. 54f.) Mr. Wilson and assistants.

56s. Quantitative Pharmaceutical Chemistry. A substantial portion of the course deals with oxidation-reduction methods of analysis. The remainder is essentially the application of the preceding fundamentals to the analysis of volatile oils and alkaloids. Laboratory work consists of assaying pharmaceutical products by oxidation-reduction procedures; alkaloidal assays and the assays of volatile oils are also included. (4 cred.; sr.; prereq. Pharm. Chem. 55w.) Mr. Wilson and assistants.

161f-162w-163s. Organic Pharmaceutical Products. This course treats of the sources, methods of production, properties, reactions, relationships of structures to activity, and uses of the natural and synthetic organic compounds used as therapeutic agents. (9 cred.; jr., sr., grad.; prereq. Org. Chem. 2.) Mr. Gisvold.

In 161f, the above considerations deal with hydrocarbons, halogenated hydrocarbons, alcohols, aldehydes, ketones, acids, phenols, ethers, and esters.

Likewise, 162w considers analgesics, organometallics, (i.e., mercurials, silver compounds, arsenicals, bismuth compounds), dyes, surface active agents, miscellaneous antiseptic agents, sulfonamides and antibiotics.

In 163s, the above treats of pressor principles, myotics, mydriatics, antispasmodics, local anesthetics, barbiturates and related compounds, alkaloids, tannins, cardiac glycosides, sex hormones and structurally related compounds, and vitamins.

164w-165s. Special Analytical Methods. A consideration of the Food, Drug, and Cosmetic Act and of many of the official analytical methods of the United States Pharmacopoeia, National Formulary, and the Association of Official Agricultural Chemists. The laboratory work consists of special analytical methods, both physical and chemical, employed in the analyses of some drugs and foods. The viscosimeter, Abbé and Zeiss refractometers, polariscope, Duboscq colorimeter, photoelectric colorimeter, cryoscope, and other special instruments are used in the laboratory for quantitative measurements. Professional elective. (Students contemplating pursuing graduate work with a major in pharmaceutical chemistry and a minor in organic chemistry should elect Pharm. Chem. 164w (3 cred.) for their winter professional elective and Org. Chem. 63s (3 cred.) and 64s (2 cred.) for their spring quarter professional elective.) (6 cred.; sr., grad.; prereq. Pharm. Chem. 2w, 54f, Org. Chem. 2.) Mr. Wilson or Mr. Soine and assistants.

PHARMACOGNOSY

Professor Earl B. Fischer, Ph.D., Head; Instructor Charles E. Smyithe; Teaching Assistants Robert Leonard, B.S. in Phm., Virgil Magnuson, B.S. in Phm.; Gardener George Balok.

1f. Thallophytes. A classification and study of drugs obtained from the thallophytes. Lecture and laboratory work include a consideration of the life histories of members of this group with particular reference to the development, function, and nature of the plant parts which furnish pharmaceutical products. (2 cred.; soph.; prereq. Bot. 2w.) Mr. Smyithe and assistants.

2w. Bryophytes, Pteridophytes, and Spermatophytes. This course deals with the drugs obtained from bryophytes, pteridophytes, and spermatophytes, and is a continuation of Pharmacog. 1f. The life histories and microscopic characteristics of the members of these groups and drug products obtained from them are studied. (2 cred.; soph.; prereq. Pharmacog. 1f.) Mr. Smyithe and assistants.

3s. Angiosperms. This course in microscopy and micrometry includes a detailed study of the inner structure of vegetable drugs derived from the angiosperms. Special consideration is given cell contents and cell forms by means of which vegetable drugs may be identified and adulteration detected. (3 cred.; soph.; prereq. Pharmacog. 2w.) Mr. Smyithe and assistants.

54f. Drug Collection and Medicinal Plant Study. The course consists of the study of a large number of plants grown in the University of Minnesota medicinal plant gardens. Attention is given to the methods of cultivating and preparing crude drugs; the macroscopic characteristics of the living plants from which they are obtained; the preparation of herbarium specimens; the cleaning and milling of drugs, etc. (3 cred.; jr.; prereq. Pharmacog. 3s, Bot. 2w.) Mr. Fischer, Mr. Smyithe, and assistants.

55f.‡ Vegetable Drugs. This course treats of the identification, nature and properties of official and some of the more important nonofficial drugs belonging to plant families from the Algae through the Chenopodiaceae. The order of presentation is based upon the taxonomic classification of plant families. In this course special consideration is given to the production, properties, and uses of antibiotic drugs. (3 cred.; jr.; prereq. Pharmacog. 3s, Botany 2w.) Mr. Fischer, Mr. Smyithe, and assistants.

56w.‡ Vegetable Drugs. A course complementary to Pharmacognosy 55f. It includes the study of the drugs belonging to plant families from the Phytolaccaceae through the Malvaceae. (3 cred.; jr.; prereq. same as for Pharmacog. 55f.) Mr. Smyithe and assistants.

57s.‡ Vegetable and Animal Drugs. This course further complements Pharmacognosy 55f and 56w and includes the study of drugs belonging to plant families from the Sterculiaceae through the Compositae. In addition, U.S.P. and N.F. drugs of animal origin including endocrine products are studied with respect to the identification, nature, properties, and uses of each. (3 cred.; jr.; prereq. same as for Pharmacog. 55f). Mr. Fischer, Mr. Smyithe, and assistants.

58s. Field Work. The classes in pharmacognosy are taken on searches for native medicinal plants. Trips are arranged to include different localities such as swampland, upland, wooded tracts, etc. By so doing, the environmental and other characteristics of medicinal plants are brought to the attention of the students. (No cred.; soph., jr.; required of all students taking Pharmacog. 3s and 54f.) Mr. Fischer and assistants.

59f. Biological Products. This course is limited to the study of the preparation and pharmaceutical properties of the important official and nonofficial vaccines, toxins, antitoxins, serums, and diagnostic biological reagents. (3 cred.; sr.; prereq. Bact. 53.) Mr. Fischer.

‡ A fee of $2 is charged for this course.

60w-61s. Pharmacognosy and Pharmaco-Histology. These are courses in continuation of Pharmacog. 3s for those students wishing to elect further work in this field. Consideration is given to the microscopic appearance, structure, and function of drug tissues, cells and cell contents by means of which the identity and purity of vegetable drugs are determined. Instruction is given in the use of microscopical accessories such as the micropolariscope, microtome, microphotographic camera and in staining techniques. Registration is limited to available instructional facilities. Professional elective. (6 cred.; sr.; prereq. Pharmacog. 54f.) Mr. Fischer and assistants.

162w-163s.‡‡ Biological Assay of Drugs. This course includes didactic and laboratory considerations of the biological assays of the vegetable and animal drugs of the U.S.P. and N.F. Registration in this course is limited to available instructional facilities. Professional elective. Students who elect Pharmacog. 162w as their professional elective for the winter quarter, must take Pharmacog. 164s (Insecticides and Fungicides) for their spring quarter professional elective. (3 cred.; sr., grad.; prereq. Pharmacog. 57s, Pharm. Chem. 56s.) Mr. Fischer and assistants.

164s. Insecticides and Fungicides. Discussion of the principal types of insects and fungi which attack farm and garden crops or cultivated medicinal plants or which may be injurious in the household. Consideration is given to the methods and substances used for the prevention or control of damage caused by such insects and diseases. Professional elective. (3 cred.; sr., grad.) Mr. Fischer.

Courses Included in the Pharmacy Curriculum and Offered by Other Departments of the University

BACTERIOLOGY AND IMMUNOLOGY

Professor Robert G. Green, M.D., Head.

53f,w,s,su. General Bacteriology. Lecture and laboratory course. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. (5 cred.; jr.; prereq. one yr. biol., one yr. chem.) Ar.

BOTANY

Professor Ernst C. Abbe, Ph.D., Chairman; and assistants.

1f‡-2w.‡ General Botany. A survey lecture and laboratory course on plants; characteristics of living matter; fundamental facts of growth, structure and reproduction; principles of inheritance; relations of plants to their environment. (3 cred. per qtr.; no prereq.) Ar.

CHEMISTRY: INORGANIC

Professor M. Cannon Sneed, Ph.D., Chief; Assistant Professor Thomas D. O'Brien, Ph.D.; and assistants.

6f-7w.‡ General Inorganic Chemistry. A study of the general laws of chemistry and of the nonmetals, metals and their compounds. (5 cred. per qtr.; fr.; no prereq.) (Credits earned in Gen. Inorg. Chem. 9 and 10 are accepted in lieu of Gen. Inorg. Chem. 6-7.) Mr. O'Brien and assistants.

‡ A fee of $1.50 per quarter is charged for this course.

‡‡ A fee of $5 per quarter is charged for this course. Graduate students must complete both quarters before they will be given credit for this course.

12s.‡‡ Semimicro Qualitative Analysis. Laboratory work in systematic qualitative analysis of the cations with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, etc. (5 cred.; prereq. 7 or 10.) Mr. O'Brien and assistants.

CHEMISTRY: ORGANIC

Professors Lee I. Smith, Ph.D., Chief, Walter M. Lauer, Ph.D., Richard T. Arnold, Ph.D., C. Frederick Koelsch, Ph.D.; Assistant Professors Robert M. Dodson, Ph.D., William E. Parham, Ph.D.

61f,w,su‡-62w,s,su.‡ Elementary Organic Chemistry. Discussion of important classes of organic compounds, both aliphatic and aromatic. Laboratory work includes the preparation of typical substances. (4 cred. per qtr.; pharm., premed., predent.; prereq. Inorg. Chem. 12 or 11.) Mr. Arnold, Mr. Koelsch, Mr. Dodson, and assistants.

63f,s. Elementary Organic Chemistry. Lecture course. Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Courses 63 and 64 are prerequisite to all other advanced courses in organic chemistry. Those senior pharmacy students who contemplate pursuing graduate work with a major in pharmaceutical chemistry and a minor in organic chemistry must elect this course and Course 64 as their professional elective of the spring quarter. They will be required to take Pharm. Chem. 164w (Special Analytical Methods) as their professional elective for the winter quarter. (See page 18.) (3 cred.; prereq. two quarters of organic chemistry.) Mr. Parham.

64f,s.‡ Elementary Organic Chemistry. Laboratory course. To accompany Course 63. Preparation of typical substances, some original work. Must be accompanied or preceded by Course 63. (3 cred.; 1 lect. and 6 hrs. lab. work weekly.) Mr. Parham and assistants.

ECONOMICS AND BUSINESS ADMINISTRATION

ECONOMICS

Professors Richard L. Kozelka, Ph.D., Dean, Ernest A. Heilman, Ph.D., Roland S. Vaile, M.A.; Associate Professors Helen G. Canoyer, Ph.D., Harry J. Ostlund, B.A.; and instructors.

Econ.10f. An Introduction to Economics. The organization of modern industry; the various forces that influence prices, such as consumer demand, cost, degree of competition or monopoly, the quantity and rate of circulation of money, etc. (3 cred.; open only to College of Pharmacy students; no prereq.) Ar.

Econ.30w. Elements of Retail Accounting. The principles of accounting applied to retail record keeping, adjustment, and closing of records. The construction and analysis of statements. (3 cred.; open only to College of Pharmacy students; prereq. Econ. 10.) Mr. Ostlund.

BUSINESS ADMINISTRATION

B.A.67s. Retail Store Management. The principles of retail store management, including the planning and control of store operation, the nature of consumer demand, and the analysis of retailing costs. (3 cred.; open only to College of Pharmacy students; prereq. Econ. 10 and 30.) Miss Canoyer.

‡ A fee of $2 per quarter is charged for this course. The student should purchase a $5 chemistry deposit card from the bursar, in the Administration Building. No student will be assigned a desk in the laboratory until he presents this card. The $2 course fee, laboratory material, and breakage will be charged against this deposit.

‡‡ A fee of $2.40 is charged for this course. A $5 chemistry deposit card required.

ENGLISH

Professor Joseph W. Beach, Ph.D., Chairman; and instructors.

4f-5w-6s. Freshman Composition. (3 cred. per qtr.; fr.; prereq. placement test.)

MATHEMATICS

Professor Raymond W. Brink, Ph.D., Chairman; and instructors.

1f,w,s. Higher Algebra. (5 cred.; fr.; prereq. one year of elementary algebra. Open for credit to any student offering not more than one-half year of high school higher algebra for entrance.) Ar. For class hours, see *Combined Class Schedule.*

6f,w,s. Trigonometry. (5 cred.; fr.; prereq. plane geometry and either Course 1 or high school higher algebra.) Ar. For class hours, see *Combined Class Schedule.*

7f,w,s. College Algebra. (5 cred.; fr.; prereq. 6 or high school trigonometry if approved by the department chairman.) Ar. For class hours, see *Combined Class Schedule.*

15f,w-16w,s. Elementary Mathematical Analysis. A course for pharmacy, premedical, and other students who desire a survey of college mathematics including trigonometry, algebra, and calculus with emphasis on fundamental ideas rather than on technical preparation for more advanced courses in mathematics. (10 cred.; prereq. plane geometry and either Course 1 or high school higher algebra.) Ar. For class hours, see *Combined Class Schedule.*

For advanced mathematics courses consult the *Combined Class Schedule.*

PHARMACOLOGY

Professor Raymond N. Bieter, M.D., Ph.D., Head; Associate Professor Harold N. Wright, Ph.D.; Assistant Professor John T. Litchfield, Jr., M.D.

2f. Pharmacology for Pharmacy Students. A detailed study of the actions of drugs and therapeutic uses, and their toxic manifestations. (3 cred.; sr.; prereq. Physiol. 4.) Dr. Bieter.

3w. Pharmacology for Pharmacy Students. The lectures are a continuation of Course 2f. Laboratory exercises on the important types of drug reactions *in vitro* and *in vivo.* (5 cred.; sr.; prereq. Pharmacol. 2f.) Dr. Bieter.

PHYSICS

Professor J. William Buchta, Ph.D., Chairman; and instructors.

1af-2aw-3as.‡‡ Introduction to Physical Science. Laboratory included. Lectures and experimental demonstrations of the principles underlying physical phenomena. (12 cred.; all; prereq. high school algebra and geometry.) Mr. Buchta.

PHYSIOLOGY

Professor Maurice B. Visscher, M.D., Ph.D., Head; Associate Professor Allan Hemingway, Ph.D.; and instructors.

4s. Human Physiology. Lecture, demonstrations, and quiz. (4 cred.; Pharm., S.L.A., H.Econ. and others; prereq. one qtr. zool., one qtr. chem.) Mr. Hemingway and others.

‡‡ A fee of $2 per quarter is charged for this course.

SCHOOL OF PUBLIC HEALTH

Professors Gaylord W. Anderson, B.A., M.D., Head, William A. O'Brien, M.D.; Associate Professor Donald W. Cowan, M.D., M.S.; and assistants.

3f,w,s. Personal Health. Elementary principles of normal body functions; predisposing and actual causes of disease; ways in which disease may be avoided. (2 cred.; fr., soph.; no prereq., not open to students who have taken Human Biology (G.C. 10C) in General College.) Dr. O'Brien.

51s. Community Hygiene. Elementary concepts of development, spread, and prevention of preventable diseases; community programs for their control. (3 cred.; jr., sr.; prereq. 3 or Human Biology in the General College; not open to students who have taken 4, 50, 52, or 53.) Dr. Cowan.

ZOOLOGY

Professors Dwight E. Minnich, Ph.D., Chairman, Jerry E. Wodsedalek, Ph.D.; Assistant Professor Ralph W. Dawson, Ph.D.; and assistants.

14f,15w.*‡ General Zoology. (10 cred.; all; no prereq.) (Pharmacy students should register for lecture section 3 and laboratory section 4.) Mr. Dawson and assistants.

* To receive credit for any part of this course a student must complete the parts preceding the asterisk.

‡ A fee of $1.50 per quarter is charged for this course.

The Bulletin of the
UNIVERSITY *of* MINNESOTA

School of Nursing Announcement for the Years 1947-1949

Basic Professional Curricula in Nursing
Advanced Professional Curricula for Professional Nurses
Certificate Curricula in Clinical Nursing for Professional Nurses
Certificate Curriculum in Practical Nursing

Volume L, Number 16 May 14, 1947

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UNIVERSITY CALENDAR, 1947-48

1947			*Fall Quarter*
August 1 - September 26			Entrance Tests.[1] Fall Registration[2]: Dates for the various colleges will be announced in the press and in mailed instructions. Students who can do so are urged to register early. It is expected that all students who can do so will register before September 1
September	15	Monday	Extension registration, first semester, begins
September	18	Thursday	Fall quarter fees due for students registered through September 11
September	22-26		New student week; program of orientation. Details will be announced in instructions issued at registration. All new students are expected to attend
September	26	Friday	Last day for registration[2] and payment of fees for the undergraduate colleges
September	29	Monday	Fall quarter classes begin 8:00 a.m.[3] First semester extension classes begin[4]
October	2	Thursday	Opening convocation, 11:00 a.m.
October	4	Saturday	Last day for extension registration and for registration and payment of fees for the Graduate School, and for teachers in service
October	13	Monday	(Sunday, October 12, Columbus Day); holiday (except extension)
November	1	Saturday	Dads Day
November	8	Saturday	Homecoming Day
November	11	Tuesday	Armistice Day; holiday (except extension)
November	13	Thursday	Senate meeting, 4:00 p.m.
November	27	Thursday	Thanksgiving Day; holiday
December	12-13 and 15-18		Final examination period
December	18	Thursday	Fall quarter ends 6:00 p.m.[5]; Commencement, 8:00 p.m.
			Winter Quarter
December	26	Friday	Winter quarter fees due for students in residence fall quarter in undergraduate colleges
1948			
January	2	Friday	Entrance tests[1]
January	2-3		Registration[2] in all colleges for new students not already registered. Registration and payment of fees for new students in all undergraduate colleges closes at noon, Saturday, January 3
January	5	Monday	Winter quarter classes begin 8:00 a.m.[3] Extension classes resume
January	10	Saturday	Last day for registration and payment of fees for the Graduate School, and for teachers in service
January	26	Monday	Second semester extension registration begins
February	7	Saturday	First semester extension classes close
February	9	Monday	Second semester extension classes begin[4]

See page 3 for footnotes.

February	12	Thursday	Lincoln's Birthday; holiday (except extension)
February	14	Saturday	Last day for extension registration
February	19	Thursday	Charter Day Convocation, 11:00 a.m.; Senate meeting, 4:00 p.m.
February	23	Monday	(Sunday, February 22, Washington's Birthday); holiday (except extension)
March 12-13 and 15-18			Final examination period
March	18	Thursday	Spring quarter fees due for students in residence winter quarter in undergraduate colleges. Winter quarter ends 6:00 p.m.; Commencement, 8:00 p.m.

Spring Quarter

March	26	Friday	Good Friday; holiday (except extension)
March	27	Saturday	Entrance tests[1]; Registration[2] for new students not already registered Registration and payment of fees for new students in all undergraduate colleges closes at 4:00 p.m.
March	29	Monday	Spring quarter classes begin 8:00 a.m.[3]
April	3	Saturday	Last day for registration and payment of fees for the Graduate School, and for teachers in service
May	8	Saturday	Mothers Day
May	13	Thursday	Cap and Gown Day Convocation, 11:00 a.m.; Senate meeting, 4:00 p.m.
May	31	Monday	(Sunday, May 30, Memorial Day); holiday (except extension)
June	4	Friday	Second semester extension classes close
June	6	Sunday	Baccalaureate service
June	7-12		Final examination period
June	12	Saturday	Spring quarter ends 6:00 p.m.; Seventy-sixth annual commencement, 8:00 p.m.

Summer Session

June	14-15		Registration[2] for new students not already registered. First term fees due for students in all colleges
June	16	Wednesday	First term Summer Session classes begin 8:00 a.m.[3]
July	5	Monday	(Sunday, July 4, Independence Day); holiday
July	23	Friday	First term closes
July	26	Monday	Registration[2] for new students not already registered. Second term fees due for students in all colleges
July	27	Tuesday	Second term classes begin 8:00 a.m.[3]
August	26	Thursday	Summer commencement, 8:00 p.m.
August	28	Saturday	Second term closes

[1] Applicants are urged to take entrance tests one to two months in advance of the quarter for which admission is desired. Tests may be taken at the Student Counseling Bureau, 101 Eddy Hall.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See privilege fees for late registration or late payment of fees, page 36, General Information Bulletin.

[3] First hour classes begin at 7:45 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

[5] Extension classes end Friday, December 19, and resume Monday, January 5.

ADMINISTRATIVE OFFICERS

J. L. Morrill, B.A., LL.D., President
Malcolm M. Willey, Ph.D., L.H.D., Vice President, Academic Administration
William T. Middlebrook, B.A., M.C.S., Vice President, Business Administration
Anne Dudley Blitz, M.A., LL.D., Dean of Women
Katharine J. Densford, M.A., R.N., D.Sc., Director of School of Nursing
Harold S. Diehl, M.A., M.D., D.Sc., Dean of the Medical Sciences
Mellie Palmer, R.N., M.S., C.P.H., Director of Community Health Service of Minneapolis
Wesley E. Peik, Ph.D., Dean of the College of Education
Robert E. Summers, M.S., M.E., Dean of Admissions and Records
Pearl Shalit, R.N., M.S.S., Director of St. Paul Family Nursing Service
Margaret Taylor, R.N., M.A., Director of the Course in Public Health Nursing
Edmund G. Williamson, Ph.D., Dean of Students

FACULTY

The faculty of the School of Nursing includes qualified instructors and clinical supervisors responsible for the organized instruction in the school and those nursing administrators who carry responsibility for the educational program of the school. Such persons are regularly appointed members of the university faculty and hold the rank of professor, associate professor, assistant professor or instructor.

COMMITTEES

ADMINISTRATIVE COMMITTEE

J. L. Morrill, B.A., LL.D., President
Harold S. Diehl, M.A., M.D., D.Sc., Dean of the Medical Sciences
Wesley E. Peik, Ph.D., Dean of the College of Education
Katharine J. Densford, M.A., R.N., D.Sc., Director of the School of Nursing
Irvine McQuarrie, M.D., Ph.D., Head of Department of Pediatrics
Margaret Taylor, R.N., M.A., Associate Professor of Public Health
Thelma Dodds, R.N., B.S., Superintendent of Nurses, Charles T. Miller Hospital
Margaret Filson, R.N., M.A., Superintendent of Nurses, University of Minnesota Hospitals
Jean W. Taylor, R.N., B.A., Superintendent of Nurses, Minneapolis General Hospital

STUDENTS' WORK COMMITTEE

This committee is made up of the director and assistant director of the School of Nursing, the superintendents of nurses of the University of Minnesota Hospitals, the Minneapolis General and the Charles T. Miller Hospitals, dean of students, dean of women, the student counselor for the School of Nursing, a representative from the clinical instructors in nursing, a representative from the Medical School, and a representative from the College of Education.

ADVISORY COMMITTEE

This committee is made up of the superintendents of the University of Minnesota Hospitals, the Minneapolis General Hospital, and the Charles T. Miller Hospital plus the Students' Work Committee and Administrative Committee of the School of Nursing.

FACULTY COMMITTEES

The following committees function in the School of Nursing:

1. Admissions
2. Advanced Clinical
3. Affiliation
4. Assignment
5. Communicable Disease and Tuberculosis
6. Curriculum
7. Directed Teaching
8. Evaluation of Nursing Credit
9. Evaluation of Nursing Practice
10. Fortieth Anniversary
11. Graduate Nurse Service
12. Guidance
13. Implementation of Public Health and Social Aspects of Nursing
14. Library (including Audio-Visual)
15. Master's Degree
16. Medical and Surgical
17. Neuropsychiatric
18. Nursing Arts
19. Obstetric and Gynecologic
20. Operating Room
21. Pediatric
22. Planning (including organization)
23. Practical Nursing
24. Public Information (including recruitment)
25. Senior Cadet
26. Student Health
27. Teaching of Sciences
28. Ward Administration

GENERAL INFORMATION

HISTORICAL STATEMENT

The University of Minnesota School of Nursing, authorized by the Board of Regents October 1, 1908, was established March 1, 1909, as a result of the efforts of Dr. Richard Olding Beard. It was the first university school of nursing in the world and, as such, led the way for other university schools which followed. The first university school carried a basic three-year curriculum leading to the degree of graduate in nursing until June 9, 1919, at which time it established a curriculum leading to the degree of bachelor of science and graduate in nursing. Since that time it has carried both a basic and a bachelor of science curriculum and, up to July, 1946, has graduated 2,373 with a diploma in nursing of whom 751 have also received a bachelor of science degree. A distinctive feature of the bachelor of science curriculum has been the requirement of seventy-five university credits before the student matriculates in the School of Nursing proper. As a result, the entire clinical program is made more meaningful than would otherwise be possible.

Another first step was taken December 14, 1920, when the plan of a central school was approved by the University. From the beginning, the University had felt that it should offer the courses it was developing for its own nursing students to other hospitals. The hospitals wishing to take part in such a venture were the Minneapolis General Hospital, the Charles T. Miller Hospital, and the Northern Pacific Beneficial Association Hospital of St. Paul. It was felt that the inclusion of these hospitals would introduce desirable practice fields for the University School of Nursing and would make possible a uniform standard of preparation for the nurses in these hospitals of a higher level than they could achieve individually. The arrangements were completed, therefore, in 1921. Though no formal contract was made, a memorandum of agreement was drawn and agreed upon by the University and the allied hospitals. On March 30, 1921, the first students in this central school of nursing were admitted to the University.

On February 19, 1925, the curriculum of clinical experience was further enriched by means of an agreement with the Hennepin County Sanatorium Commission whereby university nurse students were to receive six weeks' clinical experience (a shortened period later) at the Glen Lake Sanatorium in the care and treatment of tuberculous patients.

On January 1, 1933, the Northern Pacific Beneficial Association Hospital arranged to staff its entire nursing service with graduate nurses and nonprofessional workers, thereby aiding in the problem of unemployment among graduate nurses.

Beginning March, 1934, all students received six weeks of field experience in public health nursing (many had received it since 1932) in what is known as the Community Health Service in Minneapolis and the Family Nursing Service in St. Paul. Due to the overcrowding of the public health field, these agencies, beginning in the fall, 1939, were no longer able to give field experience to all basic three-year students. In lieu thereof these students are now receiving four weeks of experience in the nursery school plus two additional weeks in the out-patient department.

In June, 1934, the Charles T. Miller Hospital discontinued accepting freshman students for assignment in that hospital. It replaced freshman students with graduate nurses and professional workers, but continued to give experience in nursing the private patients to all students in the school. Due to the increase in student enrolment, frehsman students were assigned there again beginning with the class entering the school in September, 1942.

Beginning March, 1938, trial was made of having basic three-year students who enter directly from high school, together with all basic three-year students who have less than seventy-five college credits with one honor point per credit, enter in the fall quarter only. Students in the bachelor of science curriculum together with all basic students who had seventy-five or more college credits (with one honor point per credit) were admitted to the School of Nursing in both fall and spring quarters.

During World War II, beginning January, 1942, classes were admitted each quarter. Under this wartime program students in the basic curriculum who entered from high school, together with all basic students who had less than seventy-five college credits (with one honor point per credit) entered in the fall, winter, and summer quarters. Students in the bachelor of science curriculum, together with all basic students who had seventy-five or more college credits (with one honor point per credit) were admitted to the School of Nursing each quarter. College graduates (two-and-one-half-year program) were also admitted each quarter. This war program was made possible by federal aid which was granted through the United States Public Health Service under grant of Public Law 146—77th Congress, Chapter 269—1st Session, H.R. 4926. In June, 1943, the Congress of the United States appropriated forty-five million dollars for the establishment of the United States Cadet Nurse Corps under the Surgeon General of the United States Public Health Service. The United States Public Health Service designated the University of Minnesota School of Nursing to be one of the training centers of the United States Cadet Nurse Corps. The fall class, 1945, is the last class to be admitted under this plan.

In the spring quarter, 1941, a refresher course for inactive graduate nurses was first offered. Beginning fall quarter, 1941, and thereafter this course has been financed through federal funds. The fall 1941, winter 1942, fall 1942, and winter 1943 classes were taught in Minneapolis. Winter 1942 and winter 1943 classes were also taught in Rochester, Minnesota, and a spring 1942 class in St. Paul.

Other wartime activities have been numerous, all members of the faculty participating in some measure in intra- and extra-curricular war work.

With the beginning of the postwar period other changes were made in the curricula of the school. Beginning with the spring quarter, 1947, the only students admitted to the basic professional curricula are those who have satisfactorily completed the required prenursing credits of the degree curriculum and those who hold Bachelor's degrees from accredited colleges and universities. Classes will be admitted fall and spring quarters.

New advanced clinical programs for registered professional nurses were initiated in the fall of 1946. These programs include both degree curricula (approximately nine quarters) and certificate curricula (three quarters).

To meet the need for a group of workers in the field of nursing of less technical preparation than is required for professional nursing, a four-quarter program in practical nursing was offered for the first time in 1947.

From its inception, the school has maintained high standards for the professional and personal preparation of its students and for the nursing care of patients in its charge. Graduates of the school have made fine contributions not only to their own school, but also to the profession of nursing both in this country and abroad.

The earlier years of the school's existence were devoted to the establishment of a new type of university education in nursing; while the later ones were used for the perfecting of the plan made necessary by the merging of the university school with other schools of nursing; the war years of World War II were occupied with meeting the immediate military and civilian nursing needs; the postwar years should see continued utilization of these early foundations with increasing emphasis on broadening various phases of the nurse's preparation that she may continue to meet adequately the increasing complex and varied demands made upon her.

ACCREDITATION

The University of Minnesota School of Nursing is accredited by the Minnesota State Board of Nurse Examiners, the Association of Collegiate Schools of Nursing, and the Board of Regents of New York State. The University of Minnesota Hospitals, the Minneapolis General Hospital, and the Charles T. Miller Hospital are approved by the American College of Surgeons, the American Medical Association, and the American Hospital Association. All other fields used for student experience are accredited by the appropriate agency.

PURPOSES OF THE SCHOOL

1. To prepare young women to recognize and to meet community needs for nursing, preventive and curative, civilian and military, through the basic professional program, through the experiences in advanced clinical nursing, nursing education, and public health nursing.
2. To encourage and promote personal and professional growth.
3. To discover and stimulate individual abilities.
4. To discover and develop qualities of leadership.

ALUMNAE ASSOCIATION

Graduates of the basic professional curricula in nursing of the University of Minnesota are eligible for membership in the general University of Minnesota Alumni Association and, upon registration by some State Board of Nurse Examiners, are also eligible for membership in the Alumnae Association of the School of Nursing.

The purposes of the Alumnae Association of the School of Nursing are to promote the educational qualifications and proficiency of nurses, and to inculcate and disseminate high standards of ethical and professional conduct among persons engaged in the nursing profession.

The Alumnae Association has established an endowment fund which it continues to increase. A loan fund (see page 39) named to honor Richard Olding Beard (founder of the school and early leader in its development) and a fund which provides an annual lectureship, also honoring him, are derived from a portion of the income of the endowment fund.

The association also publishes the *Alumnae Quarterly* and an annual directory of members. Its location is 500 Essex Street Southeast, Minneapolis 14, Minnesota.

ORGANIZATION

The School of Nursing functions in the field of medical sciences and in the field of education. The administration of the school is conducted largely through the faculty and committees, as follows:

1. **The faculty.** A faculty of a school of the University of Minnesota, according to the Constitution and By-Laws of the University Senate, controls the internal affairs of the school, including entrance requirements, curricula, instruction, examinations, grading, degrees, discipline, and the selection and conditions of use of the departmental library. The faculty works through committees whose responsibility it is to analyze, study and make recommendations to the faculty regarding matters within the scope of their interest. Committees are listed on page 5.

2. **The Administrative Committee** (see page 4) decides matters of educational policy and general conduct of the School of Nursing.

3. **The Students' Work Committee** (see page 4) assists in determining policies regarding individual students, their acceptance into the school, continuance, discipline, etc., and makes recommendations concerning the general conduct of the school.

4. **The Advisory Committee** (see page 4) composed of the Administrative Committee, the Students' Work Committee, and the superintendent or executive officer of each associated hospital, is consulted regarding matters involving relationships of the hospitals to the School of Nursing.

UNIVERSITY PRIVILEGES

Nurse students enjoy the same university privileges as do other students insofar as their nursing practice will permit. They have representation in such student groups as the All-University Student Council and, in the case of students in the degree curricula, are eligible for membership in honorary and social societies.

Sigma Theta Tau, the national scholarship society of nursing, is recognized by the University of Minnesota as one of the honorary societies of the campus. Membership is based upon scholastic merit, professional achievement, and qualities of leadership.

Alpha Tau Delta is another national nursing society which has a chapter at the University of Minnesota. Both societies sponsor professional and social activities.

Nurse students have free access to the University Library which is located in the main quadrangle of the University. The nursing library proper is located on the second floor of the building as a part of the biological-medical library.

Coffman Memorial Union, the center of student activities on the campus, is open to nurse students. Among the many facilities provided by this modern new building are ballrooms adequate for student social affairs, committee and general meeting rooms for student organizations, the student post office, lounges, restaurant, and a cafeteria.

Nurse students are entitled to make use of university tennis courts, golf course, gymnasium, and swimming pool and may buy tickets for all athletic events at student rates. The Y.W.C.A. of the University is open to all women students as are the student religious organizations sponsored by churches of different denominations.

Perhaps the greatest privilege accorded the students is that of attending lectures and concerts at the University either free or at markedly reduced student rates. Among these are the symphony concerts given by the Minneapolis Symphony Orchestra, the University Artists Course, the Student Forum, and the Thursday morning convocation lectures as well as special lectures in the various departments. Student dramatic organizations present several plays on the campus each year.

ORIENTATION AND COUNSELING PROGRAM

In order to receive maximum benefit from the educational programs of the University many students need individual assistance in their professional or personal adjustments. Students in all of the nursing curricula are encouraged to become familiar with and make full use of the many personnel services of the University. Handbooks and bulletins containing helpful information concerning these services are issued to students at the time of entrance. The week before the opening of the fall quarter is set aside as New Student Week. Participation in the activities scheduled at that time helps to orient the students to the academic and social world they are entering.

Throughout the student's enrolment in the University such facilities as the Student Counseling Bureau, the Speech Clinic, the Students' Health Service, and many others are available as sources of aid in individual problems. For description of these facilities, the student is referred to the Bulletin of General Information.

Each student in the various nursing curricula is assigned an adviser from the School of Nursing faculty. This adviser makes every effort to become personally acquainted with her advisees in order to help them evaluate and make use of the offerings of the University in relation to their own specific needs.

In order to give students in the nursing curricula special help in adjusting to the requirements of their professional experience, the School of Nursing also provides a counselor who devotes full time to student activities and problems. She is available at all times for individual conferences with students who feel the need of advice or help, and she works closely with other members of the faculty in helping the students to make the most of their opportunities.

CURRICULA OFFERED

The following four major types of curricula are offered by the School of Nursing and associated divisions of the University. The admission requirements, required courses, expenses, and other data for each major type are described in a separate section of this bulletin under the appropriate heading.

Attention should be called to the fact that postwar revision of each of these curricula is being carried on at the present time. Changes already made have been indicated in this bulletin but other changes will doubtless be made in the near future. These changes will become effective as rapidly as it is possible to introduce them into existing programs without retroactive action.

I. Basic professional curricula in nursing:
   A. Degree curriculum in professional nursing.
   B. Curriculum in professional nursing for college graduates.
II. Advanced professional curricula for registered professional nurses:
   A. Nursing education.
   B. Advanced clinical courses.
   C. Public health nursing.
III. Certificate curricula in clinical nursing for registered professional nurses.
IV. Certificate curriculum in practical nursing.

NONRESIDENT APPLICANTS

During the postwar emergency in veterans' education, restrictions apply of necessity to consideration of persons resident outside of Minnesota. For current information regarding the admission of nonresidents, see the *General Information Bulletin* of the University, or inquire of the Office of Admissions and Records or School of Nursing, University of Minnesota, Minneapolis 14, Minnesota, naming the nursing curriculum of your interest and stating your preparation for that work.

COURSES FOR GRADUATE NURSES IN VETERANS ADMINISTRATION

NEUROPSYCHIATRIC HOSPITALS

At the request of the Veterans Administration a special program has been arranged for graduate nurses employed in the Veterans Administration neuropsychiatric hospitals. Selected nurses from this group are detailed from the hospitals for ninety days for one quarter of university work at the University of Minnesota. These students register in the nursing education curricula but have specially selected programs to meet their individual needs. Veterans Administration neuropsychiatric hospital nurses who wish further information should consult the Veterans Administration central office.

SUMMER COURSES

The University of Minnesota offers two six-week terms in the summer during which period students may complete approximately 18 credits of work in prenursing subjects or advanced professional curricula.

Special courses for graduate nurses are offered during the first term (six weeks) of the Summer Session in the School of Nursing and the School of Public Health. Whenever possible, guest instructors outstanding in their respective fields are added to the regular faculty for these courses. Courses offered cover such subjects as ward administration, teaching, supervision, personnel programs, administration in schools of nursing, and public health nursing in its various phases.

A special summer announcement describing these courses can be had upon request to the dean of admissions and records.

GRADUATE STUDY

Graduate nurses who hold a bachelor of science or bachelor of arts degree and who meet the requirement of the Graduate School may earn a Master's degree in any one of various fields that are closely associated with the field of nursing. Among the fields recommended for graduate study are bacteriology, educational administration, educational psychology, pathology, personnel work, physiology, psychology, and the social sciences. Programs should be made out in consultation with a major adviser in the School of Nursing and in the chosen department. Graduate programs are being developed in the field of nursing education and it is hoped that these will be available in the near future.

I. Basic Professional Curricula in Nursing

A. DEGREE CURRICULUM IN PROFESSIONAL NURSING

ADMISSION

Application for admission should be made in writing to the Dean of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota.

Applicants for admission to the degree curriculum in professional nursing must meet the entrance requirements of the College of Science, Literature, and the Arts. For details concerning admission requirements, see General Information Bulletin, which may be obtained from the Office of Admissions and Records, University of Minnesota.

Attention is called to the requirement of two units of high school mathematics, which is sometimes overlooked. In the matter of elective subjects students who are considering the study of nursing are advised to take chemistry and physics in high school and to select most of their electives from "standard" rather than "vocational" subjects. History and social science courses are also recommended, as well as a foreign language, if the student who is interested can complete at least two language units.

Admitted students will register in the College of Science, Literature, and the Arts during the first five quarters of the curriculum. They may enter the University before the age of eighteen but should be eighteen before transferring to the School of Nursing.

Acceptance into the School of Nursing is not made until the 75 credits of the prenursing subjects have been completed with an average of one honor point per credit (C average) for total credits earned (see outline page 13). Students who have taken work in junior colleges or other accredited colleges or universities, may apply the credits toward the degree curriculum. Students carrying prenursing programs in other colleges should be sure that they are taking courses equivalent to the required courses listed on page 13. As a rule students find it most satisfactory to transfer to the University of Minnesota at least by the end of the first year. If they plan to take the entire prenursing program elsewhere they should complete all but 12 credits of the required courses. If questions arise as to selection of equivalent courses, students should consult the School of Nursing office, preferably by the end of the third quarter. Official transcripts of such credits should be submitted to the university Dean of Admissions and Records for evaluation as far in advance of date of desired entrance as possible. Students may begin the prenursing portion of the degree curriculum at the beginning of any qurater. However, they may transfer to the School of Nursing (the sixth quarter in the curriculum) only at the beginning of the fall and spring quarters.

ADMISSION—TRANSFER FROM OTHER SCHOOLS OF NURSING

It is not the usual policy of the School of Nursing to accept students wishing to transfer after they have begun clinical experience in another school of nursing. Before such a transfer can be considered all prenursing credits must be completed and a complete record of the work in the other school of nursing submitted. In almost every case a great deal of time would be lost in transfer.

OUTLINE OF CURRICULUM

Students in this curriculum are required to complete 185 credits for graduation. The curriculum is divided into three parts as follows:

Part I. Five quarters in the College of Science, Literature, and the Arts either in the University of Minnesota or some other accredited university or college.

Part II. Ten quarters in the School of Nursing (first quarter on the campus, and nine quarters in clinical divisions).

Part III. Three quarters in the College of Education or in the School of Public Health.

PART I: COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS
(Five quarters)

During the first five quarters the student must complete 75 credits in addition to Physical Education and enough of the required courses listed below so that *all* required courses will be completed by the end of the sixth quarter (first quarter in the School of Nursing). Preferably not more than 12 credits of *required courses* including Nursing 12, 3 credits, and Nursing 1, 1 credit, should be left for the sixth quarter. She must earn an average of one honor point per credit (C average) for total credits earned in the prenursing period, and must have demonstrated ability to earn a C average while carrying a normal university credit load.

A. Required courses to be completed by the end of the 6th quarter.

	Credits
English A-B-C or 4-5-6 or Com. 1-2-3 or exemption	8 or 10
Chemistry, Inorganic	8 or 10
Zoology 1-2-3	10
Sociology 1	5
Sociology 49	3
Psychology 1 and 2	6
Child Welfare 40 or Home Economics Education 90	3
Public Health 3	2
Anatomy 3	3
Physiology 50	4
Physiology 60*	6
Bacteriology 53* or 101 and 102	5 or 9
Pharmacy 8a	1
Home Economics 31* or 30 or Nursing 10	3 or 2 or 1
Physical Education	5
Nursing 1, first quarter in the School of Nursing	1
Nursing 12, first quarter in the School of Nursing	3
Social Science other than sociology	9

(Required only of students taking Public Health major. Recommended for all students.)

B. Elective courses. Thought should be given to possible fields of specialization in choosing electives. See pages 16 to 19. Recommended electives include courses in political science, philosophy, humanities, anthropology, child welfare.

Advisers from the School of Nursing faculty are assigned to prenursing students in the College of Science, Literature, and the Arts. Before registering each quarter, students should have their programs reviewed by their adviser in the School of Nursing.

A suggested two-year program follows: The choice of electives and sequence of courses may be varied in accordance with the individual needs and interests of the students.

First Year

Fall	*Winter*	*Spring*
English 4f or Af or Com. 1f	English 5w or Bw or Com. 2w	English 6s or Cs or Com. 3s
Chemistry 1f or 4f or 6f	Chemistry 2w or 5w or 7w	Sociology 1s
Zoology 1f	Zoology 2w	Zoology 3s
Public Health 3f	Physical Education	Anatomy 3s
Physical Education	Electives†	Physical Education
Electives†		

Second Year

Fall	*Winter*	*Spring* (Part II) (School of Nursing—1st quarter)
Psychology 1f	Psychology 2w	History of Nursing 1s
Physiology 50f	Child Welfare 40w or Home Economics Ed. 90w	Nursing 12s
Bacteriology 53f	Home Economics 31w	Physiology 60s
Physical Education	Sociology 49w	Pharmacy 8a
Electives†	Physical Education	Electives†
	Electives†	

* In 1947-48 sophomores who lack time to complete the required prerequisites for Physiol. 50 and 60 and Bact. 53 will be permitted to substitute Physiol. 1 and 2 and Bact. 1. After that date the courses listed will be required unless individual exceptions are permitted by special action of the Students' Work Committee

† Electives should be chosen to make, on the average, a program of 15 credits per quarter in addition to physical education. Social science should be chosen in the freshman year if possible.

PART II: SCHOOL OF NURSING
(TEN QUARTERS)

Students in the degree curriculum transfer from the College of Science, Literature, and the Arts to the School of Nursing at the end of the fifth quarter. During the sixth quarter (first quarter in the School of Nursing) they complete, from the list of required courses already given on page 13, all courses they have not completed while in the College of Science, Literature, and the Arts, and in addition enough electives to make a total of 90 credits completed by the end of the six quarters in addition to physical education. Nursing 12 and 1 are taken in this quarter.

These students are admitted to the School of Nursing fall and spring quarters. They remain in the School of Nursing ten quarters.

During this period the following required courses must be completed in addition to those completed in the first quarter in the School of Nursing.

Course No.	Title	Class Hrs.	Lab. Hrs.	Total Hrs.
Neuropsy. 171	Descriptive Neuropsychiatry	44	.....	44
Nurs. 11A-B	Foods and Nutrition	11	33	44
Nurs. 13	Introduction to Public Health	22	.....	22
Nurs. 14	Introduction to Medical Sciences	22	.....	22
Nurs. 15A-B	Nursing Arts	33	44	77
Nurs. 16	Advanced Nursing Arts	11	22	33
Nurs. 18	Principles of Medical and Surgical Nursing	44	.....	44
Nurs. 19	Principles of Medical and Surgical Nursing	44	.....	44
Nurs. 20	Principles of Nursing in Conditions of the Skin	11	.....	11
Nurs. 21	Principles of Medical and Surgical Nursing, Continued	22	.....	22
Nurs. 25	Principles of Orthopedics and Orthopedic Nursing	22	.....	22
Nurs. 35	Principles of Communicable Disease Nursing	22	.....	22
Nurs. 36	Principles of Tuberculosis and Tuberculosis Nursing	22	.....	22
Nurs. 41	Principles of Pediatrics and Pediatric Nursing	33	.....	33
Nurs. 42	Principles of Nursing in Obstetrics and Gynecology	33	.....	33
Nurs. 45	First Aid	22	.....	22
Nurs. 49	Principles of Care in Eye Conditions	11	.....	11
Nurs. 50	Professional Adjustments	22	.....	22
Nurs. 53	Field Practice in Public Health Nursing	11	.....	11
Pharm. 8	Elementary Pharmacology	22	22	44
	Total	484	121	605

Courses dealing with clinical experience are scheduled to precede or parallel the individual student's clinical assignment. A typical class schedule for the second through tenth quarters follows:

TYPICAL CLASS PROGRAM AFTER FIRST QUARTER

First Year—Second Quarter

Course No.	Title	Class Hrs.	Lab. Hrs.	Total Hrs.
Nurs. 11A-B	Foods and Nutrition	11	33	44
Nurs. 13	Introduction to Public Health	22	.....	22
Nurs. 15A-B	Nursing Arts	33	44	77
Nurs. 18	Principles of Medical and Surgical Nursing	44	.....	44
Pharm. 8	Elementary Pharmacology	22	22	44
	Total	132	99	231

First Year—Third and Fourth Quarters

Neuropsy. 171	Descriptive Neuropsychiatry	44	.....	44
Nurs. 16	Advanced Nursing Arts	11	22	33
Nurs. 19	Principles of Medical and Surgical Nursing	44	.....	44
Nurs. 41	Principles of Pediatrics and Pediatric Nursing	33	.....	33
Nurs. 45	First Aid	22	.....	22
	Total	154	22	176

Second Year—Fifth to Eighth Quarters

Course No.	Title	Class Hrs.	Lab. Hrs.	Total Hrs.
Nurs. 14	Introduction to the Medical Sciences	22	.....	22
Nurs. 20	Principles of Nursing in Conditions of the Skin	11	.....	11
Nurs. 21	Principles of Medical and Surgical Nursing, Continued	22	.....	22
Nurs. 25	Principles of Orthopedics and Orthopedic Nursing	22	.....	22
Nurs. 35	Principles of Communicable Disease Nursing	22	.....	22
Nurs. 42	Principles of Nursing in Obstetrics and Gynecology	33	.....	33
	Total	132	.....	132

Third Year—Ninth and Tenth Quarters

Nurs. 36	Principles of Tuberculosis and Tuberculosis Nursing	22	.....	22
Nurs. 49	Principles of Care in Eye Conditions	11	.....	11
Nurs. 53	Field Practice in Public Health Nursing	11	.....	11
	Total	44	.....	44

CLINICAL EXPERIENCE

The clinical experience of the students begins in the second quarter in the School of Nursing. Assignment of students for clinical experience in the various hospitals and agencies is made by the Students' Work Committee. Assignments depend in large measure upon the clinical experience needs of the students. All students entering the school after January, 1947 have the major portion of their hospital experience at the University of Minnesota Hospitals. The hospitals and agencies in which the students receive their clinical experience are as follows:

The University of Minnesota Hospitals, situated on the University campus, include the Elliot Memorial Hospital, the Cancer Institute, the Todd Memorial and Eustis Children's Hospitals. They are supported by state funds and endowments. They care for patients sent in from all parts of the state. The daily average of patients from July 1, 1945 to July 1, 1946 was 390.

The Minneapolis General Hospital is public in nature and cares principally for the sick of the city of Minneapolis. The Communicable Disease Department in this organization serves the city of Minneapolis—private, as well as public. This hospital has a large number of accident and emergency cases and a wide variety of acute diseases. The daily average of patients from July 1, 1945 to July 1, 1946 was 413.

The Charles T. Miller Hospital, in St. Paul, has 50 beds for free patients and 250 beds for private and semi-private patients. The daily average of patients from July 1, 1945 to July 1, 1946 was 285.

The Hennepin County Tuberculosis Sanatorium at Glen Lake, an institution of over 700 beds, caring for all types of tuberculosis, is associated with the School of Nursing to give the students experience in the care of tuberculous patients. All students are assigned for this experience in the latter half of their course. Beginning in 1941, students with a negative Mantoux have been assigned for one week of this experience to the Public Health Center Clinic and a second week in the tuberculosis clinic of the out-patient department in one of the hospitals.

In addition, students are assigned to the Community Health Service of Minneapolis or the Family Nursing Service of St. Paul for field experience in public health nursing. Other public health agencies are added as needed.

The clinical experience is divided approximately as follows: (The number of days in the first quarter varies with the University calendar. This necessitates a few days variation in the total days of clinical experience but any other change from the following schedule must have the approval of the faculty of the School of Nursing):

Department	No. of Weeks
Medicine	19
Surgery	25
Gynecology	4
Diet Kitchen	4
Out-Patient Department	4
Tuberculosis	4
Obstetrics	12
*Pediatrics	12
Communicable Disease	6
Operating Room	6
Psychiatry	6
Public Health Nursing	6
Vacation	8
Illness Allowance (Approx.)	3
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PART III: COLLEGE OF EDUCATION OR SCHOOL OF PUBLIC HEALTH

(Students must spend three full quarters in this portion of the curriculum.)

The student selects one of two majors as follows:

A. Nursing Education for which she registers in the College of Education.

B. Public Health Nursing for which she registers in the College of Education or in the School of Public Health.

NOTE—Students wishing a combined public health and nursing education major should register in the College of Education for the primary pattern and must complete in addition the courses listed in Part III B, page 19. This combined program takes at least four quarters. Unless some of the subjects of Part III A or B have been completed in advance most students would need a fifth quarter to complete the program.

A. NURSING EDUCATION

Students in nursing education must meet the requirements for graduation of the College of Education. See College of Education Bulletin. The C+ average must be maintained for the total courses in the major field. In nursing education this requirement is met by a C+ average in the required courses in the College of Education and nursing education listed under the variant in which the student registers. Nursing education majors are exempt from Public Health 4 and Public Health 59 of the Health Education requirement.

Nursing education has, in addition to the primary pattern, four variants; namely, Ward Administration, Teaching of Sciences, Child Care, and Nutrition. Students who wish to plan a program with special emphasis upon one of the special fields should register for the appropriate variant. For any one of these the student registers in the College of Education.

Major Adviser: Katharine J. Densford, 125 Medical Sciences Building.

Primary pattern—Prepares students for nursing in institutions, for administration, or for teaching in schools of nursing and hospitals.

Course No.	Title	Credits
Ed. 51A, B	Introduction to Secondary School Teaching	6
Ed.T. 51A, B	Special Methods of Teaching and Directed Teaching in Schools of Nursing	8
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Hist.Ed. 180	The School and the Social Order	2
General Courses	Electives	19
	Total	45

Variant for those interested in Ward Administration—Designed to provide the student with theoretical background and ward experience in the activities and responsibilities of the hospital head nurse and supervisor.†

* Students have the care of the normal child in the preclinical period.

† Enrolment is limited. Permission of major adviser required.

Course No.	Title	Credits
Nursing Courses		
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 67	Field Practice in Ward Administration	6
Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Nurs.Ed. 73	Principles of Economics in Nursing Service Administration	1
Education Courses		
Ed. 51A, B	Introduction to Secondary School Teaching	6
Ed.T. 51A,B†	Special Methods of Teaching and Directed Teaching in Schools of Nursing	8
Hist.Ed. 180	The School and the Social Order	2
General Courses	Electives	8
	Total	45

Variant for those interested in the Teaching of Sciences in Schools of Nursing—Prepares the student to teach basic sciences and clinical courses in schools of nursing. The purpose is to build a broad knowledge and deep understanding of such medical sciences as are included in the nursing curricula and to study the problems involved in teaching these sciences in schools of nursing. Any student who shows special aptitude and interest in the science courses and who is interested in choosing this variant is urged to consult the director of the School of Nursing during her first year for assistance in the planning of her preclinical course since many of the required science courses must be completed previous to assignment to clinical experience. Students who have not taken a sufficient number of credits in science during the preclinical period may require more than 47 credits to complete this variant.

Course No.	Title	Credits
Nursing Courses		
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Nurs.Ed. 74	Sciences in a School of Nursing Curriculum	5
Education Courses		
Ed. 51A, B	Introduction to Secondary School Teaching	6
Ed.T. 51A, B†	Special Methods of Teaching and Directed Teaching in Schools of Nursing	8
Hist.Ed. 180	The School and the Social Order	2
Science Courses	(Physiol. 50 and Physiol. 60 and Bact. 53 or Bact. 101 are required in addition to the following courses and should be taken in the second year of the pre-nursing program. If they have not been taken previously, it is likely to take more than three quarters to complete this variant.)	
Bact. 102	Medical Bacteriology	4
Zool. 149, 150 or Zool. 21 or Anat. 61	Histology and Organology Histology	5 or 6
Zool. 22 or Anat. 59	Comparative Anatomy Systematic Anatomy	5 or 6
	Total	45 or 47

† Requirements for registration in Ed.T. 51A are as follows:

1. A passing grade in Ed. 51A, B. Students in basic degree curriculum may take Ed. 51B concurrently with Ed.T. 51A.
2. Passing of the qualifying examination in English.
3. Attainment of a scholastic average of 1.5 in the field in which the practice teaching is to be done.
4. Passing of the required speech test.

Variant for those interested in Child Care—Prepares the student for work with both well and sick children, or serves as an excellent background for nurses who may later seek additional preparation for public health work with children.*

Course No.	Title	Credits
Nursing Courses		
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Education Courses		
Ed.T. 51A	Special Methods of Teaching in Schools of Nursing	4
Ed. 71C	Introduction to Elementary School Teaching	5
Hist.Ed. 180	The School and the Social Order	2
Child Welfare and Nursery School Courses		
C.W. 80	Child Psychology	3
C.W. 70	The Teacher and the Parent	3
Ed.T. 55	Principles of Early Childhood Education	3
Ed.T. 56	Methods and Observation in Nursery School and Kindergarten	5
Ed.T. 77A	Directed Teaching in the Nursery School	4
Ed.T. 57 or	Nursery School-Kindergarten Laboratory in Arts, Literature, and Social Studies	5
Ed.T. 58	Nursery School-Kindergarten Laboratory in Permanent Play Material, Music, and Science	5
Mu.Ed. 50A	Primary Methods	2
	Electives approved by major adviser	0–3
	Total	46

Variant for those interested in Nutrition—Prepares the student for any position in which more than ordinary mastery of this field is desirable, as, for example, in Medical Nursing.

Students taking this variant must have completed Home Economics 30 (2 cred.) or Home Economics 31 (3 cred.) before entering the School of Nursing.

Course No.	Title	Credits
Nursing Courses		
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Education Courses		
Ed. 51A, B	Introduction to Secondary School Teaching	6
Ed.T.51A, B†	Special Methods of Teaching and Directed Teaching in Schools of Nursing	8
Hist.Ed. 180	The School and the Social Order	2
Home Economics Courses		
Agr.Biochem.4¶	Introduction to Organic and Biochemistry	5
H.E. 34 or	Nutrition Problems	3 or 4
H.E. 170	Nutrition of the Family	
H.E. 173	Nutrition in Disease	3
	Electives	8 or 7
	Total	45

* Students wishing to prepare themselves for teaching and supervision in pediatric services in schools of nursing and hospitals are advised to select the primary pattern with as many elective credits as possible chosen from the variant in Child Care.

† Requirements for registration in Ed.T. 51A are as follows:

1. A passing grade in Ed. 51A, 51B or in Ed. 71C (Child Care Variant). Students in basic degree curriculum may take Ed. 51B concurrently with Ed.T. 51A.
2. Passing of the qualifying examination in English.
3. Attainment of a scholastic average of 1.5 in the field in which the practice teaching is to be done.
4. Passing of the required speech test.

¶ If student has not had organic chemistry.

B. PUBLIC HEALTH NURSING

Students in public health nursing register for the last three quarters in the College of Education or in the School of Public Health and must meet the requirements for graduation of the respective colleges. See Bulletins of the School of Public Health and College of Education.

Major Adviser: Margaret Taylor, 121 Millard Hall.

The following courses are required in addition to the requirements listed under Part I.

Social Science Courses

Course No.	Title	Credits
Soc. 91 or Soc. 129	Survey of Social Work Principles of Social Case Work	5 or 3
	Note: Social Science other than Sociology—9 credits—and Bacteriology 53 should be taken during the prenursing period.	

Public Health Courses

P.H. 62-63	Principles of Public Health Nursing	6
P.H. 65, 66, 67	Field Practice in Public Health Nursing	16
P.H. 100	Elements of Preventive Medicine	5
P.H. 133 or 61	Mental Hygiene Aspects of Public Health Nursing	3
Ed. 81	Introduction to Health Education	3
	Electives in P.H. minimum	5
	General electives, any department, to bring total program to minimum of	45

The C+ average is required in the total of the public health courses.

SCHEDULE OF HOURS AND VACATIONS

During the five quarters of prenursing in the College of Science, Literature, and the Arts and in the first quarter in the School of Nursing, students in the degree curriculum carry approximately 17 hours of class per week and have no clinical experience in the nursing care of patients. During the second quarter in the School of Nursing they receive approximately 15 hours per week of clinical experience. They carry approximately 13 hours of class and 9 hours of laboratory weekly. In the third quarter they carry approximately 36 hours of clinical experience weekly, 8 hours of class, and 2 hours of laboratory. From the beginning of the fourth quarter and throughout the remainder of the two and one-half years the hours of clinical experience are approximately 42 per week. The hours of class during this same period are approximately 6 per week with the exception of the Summer Session when the class program is either reduced or omitted. Except in the case of emergencies the time of the students on full-time duty does not exceed a seven-hour day or an eight-hour night. Assignment of night duty for regular students is for approximately two months (of not more than three weeks consecutively) during the entire period in the school.

In the last three quarters of the program students in nursing education have no clinical experience except in connection with directed teaching and carry a weekly class schedule comparable to that of other students in the College of Education. Students in public health nursing carry two quarters of class work and one quarter of field practice during which they are in the field approximately 42 hours weekly.

Students in the bachelor of science curriculum have vacations as do other university students during their first five quarters and during the last three quarters. During their hospital residence they receive approximately eight weeks of vacation at their own living expense.

The vacation allotment is usually divided as follows:

The fall class has two weeks in December and two weeks in the summer of the freshman year in the School of Nursing and has four weeks in the second year in the School of Nursing. The students return to the campus in the spring quarter of their third year.

Spring class has two weeks in the summer of their freshman year in the School of Nursing; four weeks in the summer of their second year; and two weeks in the summer of their third year.

ESTIMATE OF FEES FOR DEGREE CURRICULUM IN PROFESSIONAL NURSING

PART I. (Five Quarters in the College of Science, Literature, and the Arts)

	One quarter	Total
Tuition (resident)*	$ 30.00	$ 150.00
Incidental fee	10.65	53.25
Matriculation deposit	5.00	5.00
Course fees	3.00	15.00
Laboratory deposit	5.00	5.00
Laundry§	30.00	150.00
Room rent§	55.00	275.00
Board§	128.00	640.00
Books and instruments	20.00	100.00
	$286.65	$1,393.25

PART II. (Ten Quarters in the School of Nursing)

Tuition (resident) $30 per quarter*	$300.00
Incidental fee (first quarter)	10.65
Laundry§ (first quarter)	30.00
Room rent§ (first quarter)	55.00
Board§ (first quarter)	128.00
Books and instruments	70.00
Uniforms	50.00
Transportation	8.00
	$651.65

PART III. (Three Quarters in the College of Education or School of Public Health)

	One quarter	Total
Tuition (resident)*	$ 30.00	$ 90.00
Incidental fee	10.65	31.95
Course fee (estimate)	5.00	15.00
Laundry§	30.00	90.00
Room rent§	55.00	165.00
Board§	128.00	385.00
Books and instruments	20.00	60.00
Graduation fees	.....	15.00
	$278.65	$851.95

The above estimate of expense for the degree curriculum includes university fees, uniforms, books, and maintenance. For the first five quarters, while the student is on campus, the estimate is $1,393.25. This amount is greatly reduced, of course, if the student is living at home. For the next two and one-half years, while the student is in the School of Nursing, the total estimate is $651.65. For the last three quarters, while the student is in the College of Education or School of Public Health, the total estimate is $851.95. Estimates do not include personal incidentals, clothing, traveling, and vacation expenses.

* Tuition for nonresident students is $75 per quarter.

§ These estimates vary according to the student's living arrangements.

Tuition—Information as to tuition charge per quarter is indicated above. Nonresidents add $45 per quarter for additional tuition.

Incidental fee—An incidental fee of ten dollars and sixty-five cents ($10.65) a quarter for the first six and the last three quarters is charged each student, for which the student receives such privileges as the Coffman Memorial Union, the Health Service, the *Minnesota Daily,* including the Official Daily Bulletin, and the university post-office service.

Matriculation deposit—At the student's first registration at the University a matriculation deposit of five dollars ($5) is required to cover the following charges: locker rental, locker key deposit, laboratory breakages, library fines, or damages to university property. Unused balance is returned to the student when she leaves the University.

Laboratory deposit—A laboratory deposit of five dollars ($5) is also required of students registered for courses in chemistry to cover cost of materials.¶

Course fees—For individual courses. The amounts are specified in the course announcements.

Cost of books—The expense varies with the course taken. Two- and three-quarter courses often require the purchase of only one book at the beginning of the course. Second-hand books can often be purchased at one of the various bookstores. Approximate annual cost of $60 for the first two and fifth years and approximately $35 for each of the third and fourth years should represent maximum book expenses.

Cost of uniforms‡—The student pays for her first complete set of uniforms. The hospital replaces worn-out uniforms. This charge of approximately fifty dollars ($50) is payable at the end of the first month of the sixth quarter at the University when the order is sent to the manufacturer.

Students may purchase uniforms second hand but may not have replacement by hospital until such time as sets of new uniforms purchased by classmates require replacement.

At the time uniforms are purchased, students should provide themselves with name tapes for all pieces which are to be laundered. One hundred tapes should be sufficient. These may be purchased through the office of the School of Nursing.

Fee for part-time program—Students who carry less than a full program are required to pay the same fees as students who take a full program of work. There is no credit hour or clock hour fee.

Transportation—This item of $8 includes transportation while in the School of Nursing to and from classes at the University and to and from the field when assigned to field trips or to public health nursing. It is payable at time of entrance and is not refunded if the student cancels.

Graduation fees—The student registered in the bachelor of science curriculum receives the two degrees of bachelor of science and graduate in nursing. The fee for each is $7.50 or a total of $15.

Board and room—Those students who live within commuting distance do not have this expense since they can live at home during the periods when they are not in hospital residence. There is no charge for board and room while in residence at the hospital. The cost of room and board varies widely.

Comstock Hall, residence hall for women, $150 to $170 per quarter.

Sanford Hall, residence hall for women, $125 to $155 depending upon the room selected, per quarter.

‡ Those students who elect public health nursing as their field of major interest in the last three quarters pay approximately $20 in addition for public health uniforms. Prices are subject to change without notice.

¶ For detailed information see the *Bulletin of General Information.*

†Co-operative cottages, in which the students assist with work, approximately $100 to $105 per quarter.

Rooming houses† for room per month, $12 to $20 for double rooms, $16 to $30 for single room; for board, per week, $7 to $10 for two meals per day.

PART-TIME EMPLOYMENT

Students who need to earn part of their expenses may carry outside employment during the prenursing portion of the curriculum but not during their clinical experience. Some students earn room and board in return for services in private homes; others work for hourly wages in various types of employment.

Unless a student has unusual academic ability, it is often wise for her to carry less than a full academic load if she must carry outside employment. Those needing to carry outside employment are advised to confer with their faculty adviser and to obtain information on student employment from the Office of Civil Service Personnel, Room 9 Administration Building, University of Minnesota.

HOUSING

Students in the degree curriculum provide their own maintenance during the first six quarters. They may secure rooms in Comstock or Sanford Hall (the women's dormitories) or in approved rooming houses near the University on the same basis as other university students.

Because of the present housing shortage students should secure rooms as much in advance of arrival as possible. Those needing help regarding housing should consult the Housing Bureau, Eddy Hall, University of Minnesota. During the time that students carry clinical experience in the school, they have maintenance provided for them in the various hospital nursing residences.

The University of Minnesota Hospitals house students in the Louise M. Powell Hall situated near the University of Minnesota Hospitals on ground overlooking the Mississippi River. Students at the Minneapolis General Hospital have a residence adjoining, but apart from, the hospital. The Charles T. Miller Hospital has several attractive residences. While assigned to Glen Lake Sanatorium, students are housed in an attractive building a short distance from the main hospital. The students take their meals in the nurses' dining rooms, which are under the direction of qualified dietitians. Students' rooms are supplied with all necessary furnishings including linen. Each residence has a qualified director in charge.

The rules governing the residences are made in accordance with university policies and carried out with the joint approval of the faculty of the School of Nursing and the Council of the Nurses' Student Government Association.

In the last three quarters of combined academic and professional work the students provide their own maintenance as in the first six quarters.

STUDENT ACTIVITIES

During the first six quarters the students in the degree curriculum participate in the same campus activities as do other freshmen and sophomores. (See General Information Bulletin and Handbook for Students.) During the ten quarters in the School of Nursing students are encouraged to continue in any campus activities that can be satisfactorily fitted into their professional program.

The leading student organization of the School of Nursing is the Nurses' Student Government Association. This organization co-operates with the faculty in student affairs.

† For detailed information see Bulletin of General Information.

A copy of the constitution of the association is furnished each student when she enters the School of Nursing. She is admitted to membership in the association at the end of the first three months in the school by passing an examination on the constitution, conducted by the association, and by paying the nominal dues of the organization. Students continue in membership so long as they remain in good standing in the school. They elect a president and governing council of officers. Students serve on standing committees of the faculty. The Nurses' Student Government Association usually sends a representative to the meetings of the American Nurses' Association, the National League of Nursing Education, and the Minnesota Nurses' Association.

One of the activities of the student government is to appoint upper classmen to act as "big sisters" for all entering students to assist them in adjusting to their new environment.

The hospitals co-operate with the students in planning frequent informal teas and parties for the students, and the students themselves are encouraged to plan any form of recreation which interests them and which can be wisely undertaken in addition to their nursing duties.

The school is nonsectarian, however, students are urged to form church affiliations in accordance with their choice and custom. Churches of various denominations are within walking distance of the residences so that it is possible for students to attend either morning or evening service.

Opportunities for worship and religious activities are many. Y.W.C.A., Newman Club, Hillel Foundation and various Protestant denominational groups have campus organizations which seek to enrich the spiritual life of the student.

Alpha Tau Delta and Sigma Theta Tau, the two national nursing organizations, which have chapters at the University of Minnesota, have monthly meetings and sponsor various professional and social activities.

SCHOLARSHIPS, LOANS, PRIZES

Available to Students in Nursing and Prenursing Curricula

Small loans and scholarships are available to nursing and prenursing students from a fund granted to the University for that purpose by the Kellogg Foundation. Students are also eligible, after two quarters of satisfactory work in the University, to apply for loans from the university loan funds.

Occasionally scholarships are made available to the University through the Fifth District American Federation of Women's Clubs, and the Auxiliary of the American Legion. The Bureau of Student Loans and Scholarships of the University is sometimes able to arrange for loans or scholarships for nursing school students from other sources.

The following three special awards are made to students in the graduating classes of the School of Nursing:

LOUISE M. POWELL PRIZE

A gift of $50 annually from the Alumnae Association of the School of Nursing for the establishment of the Louise M. Powell Prize of $25 to be awarded to that member of the March and June graduating classes in the School of Nursing of the University of Minnesota who has attained the highest degree of efficiency in practical work.

MARION L. VANNIER SCHOLARSHIP

A gift of $100 annually from the Nurses' Student Government Association of the University of Minnesota for the establishment of the Marion L. Vannier Scholarship. The recipient of this scholarship must be a graduate of the School of Nursing of the University of Minnesota. The scholarship is to be used for the purpose of higher education only, within two years after recipient's graduation.

ALPHA TAU DELTA SCHOLARSHIP

Alpha Tau Delta, national nursing society, grants an annual scholarship of $100 in honor of Esther M. Thompson, class of 1925, to a senior member of Alpha Tau Delta ranking high in theoretical and practical work. This scholarship is awarded for purposes of study.

HEALTH REGULATIONS

During the prenursing portion of the curriculum the student's health problems are cared for as are those of other students in the College of Science, Literature, and the Arts. This includes an entrance physical examination by the Students' Health Service and opportunity for advice and treatment at the Health Service (see General Information Bulletin). Students in the degree curriculum are urged to bring any special health problems to the attention of the Health Service physicians early in the prenursing period in order that advice and treatment may be given before the beginning of the clinical period. Students whose physical condition will not permit admission to the School of Nursing can thus replan their programs toward more suitable goals without waste of time.

Upon entrance to the School of Nursing (sixth quarter of the curriculum) the applicant must pass satisfactorily the physical examination including dental examination given by the Students' Health Service. Students whose conditions need further observation may be admitted tentatively but must cancel if later findings prove them physically unfit for nursing. The increasing emphasis on the maintenance of health and the prevention of disease necessitates that the nurse herself be physically fit.

The University School of Nursing requires students in the degree curriculum while on the campus and *before transferring to the School of Nursing* to be vaccinated against smallpox and to be immunized against typhoid fever and diphtheria.

All students receive an annual physical examination. In addition a Mantoux test is made to all students on entrance. If the reaction is positive, a chest X ray is taken. One week preceding the tuberculosis service, a Mantoux test is also taken on students whose Mantoux tests were negative on entrance. All students having a positive reaction are given a chest X ray. Students with positive reaction receive four weeks' experience at Glen Lake Sanatorium; those with negative reaction receive two weeks' observation and experience at Glen Lake Sanatorium, one week at the Public Health Center Clinic, and one week in related hospital clinics. Three months after returning from the tuberculosis service, those whose Mantoux tests were negative before entering the tuberculosis service are given another Mantoux test. Students with positive reactions receive a chest X ray at that time. A complete physical examination is given on completion of the course, including a chest X ray for students having a positive Mantoux reaction. A Mantoux test and chest X rays are given routinely to postgraduate students on entrance only. However, any student will receive a chest X ray as often as necessary for the protection of the student and the hospitals.

Through the Students' Health Service a special examination of students' feet is made and recommendation given for desirable types of shoes and, when indicated, for corrective foot exercises.

Students about whom it is decided that tonsillectomy or other surgery was indicated before admission to the school, or students under care of a private physician for some minor complaint which does not interfere with the practice of nursing but requires continued treatment, may be asked to pay for this care at the hands of the physician or surgeon of their choice.

Except in unusual circumstances a regular student in the School of Nursing who is disabled by continued illness shall be referred to her home or family as soon as she may be safely discharged from the hospital and permitted to travel, and shall thereafter be

eligible for reinstatement under the same rules as apply to any other student. In any case students must meet the cost of hospital care which is in excess of one month per year of residence in the school.

As a measure of promotion of health and of prevention of illness, students are allowed, during their course, 20 days of illness without being required to make up the time lost.

GRADES

Students in the degree curriculum are governed during the first five quarters by the regulations of the College of Science, Literature, and the Arts, and during the last three quarters by the regulations of the College of Education or of the School of Public Health (depending upon selected major), in regard to grades, credits, and honor points. While in the School of Nursing, students receive grades in accordance with the general university plan. The passing grades used are A, B, C, D, in order of excellence. The grade of I (incomplete) is given when work is not completed on time, through no fault of the student. Such work must be made up within 30 days unless the time is extended by permission of the Students' Work Committee. The grade of F in a required course must be removed by repeating the course as soon as it is offered.

CONTINUATION IN SCHOOL

Because of the complicated schedules of clinical experience and the necessity for having thoro foundation of knowledge for each new subject, it is impossible to arrange irregular class schedules for students. For this reason, no student is allowed to register for the second, third, or fourth quarter in the School of Nursing who has not satisfactorily completed the work of the preceding quarter.

The first quarter is not considered satisfactorily completed unless the student has (1) received a passing grade in each required subject, (2) received an average of C for the group (not individual courses) of the four basic science courses—physiology, physiological chemistry, bacteriology, anatomy, (3) received an average of C for the total credits taken in the quarter. The second and third quarters are not considered satisfactorily completed unless the student has (1) a passing grade in each required subject, and (2) a C average in total credits taken. In special circumstances and with the permission of the faculty, a student may repeat the courses of these quarters in order to bring her work up to standard, but while she is doing so she may not have clinical experience or time credit and must provide her own maintenance outside the nurses' residence.

Students in the School of Nursing must maintain a C average throughout their program. Those who fail to do so may, by permission of the faculty, be permitted to withdraw from clinical experience to bring up their class work to the required level.

The faculty of the School of Nursing reserves the right to cancel the registration of any student who seems to be unsuited for the nursing profession or to require the withdrawal of any student from the school when, in its judgment, the interest of the school requires it.

READMISSION

All students who miss more than a month of their work through illness or leave of absence will have to remain out of the school until such time as the class or clinical schedule can be adjusted to their needs.

LEAVE OF ABSENCE

Permission cannot be granted students to remain away for the purpose of caring for sick relatives or for other personal reasons.

REQUIREMENTS FOR GRADUATION

The Board of Regents of the University of Minnesota upon recommendation of the faculty of the School of Nursing and the College of Education or School of Public Health confers the degree of bachelor of science and of graduate in nursing upon those students who have completed satisfactorily 185 credits and have met the requirements of the degree curriculum for professional nursing as outlined on pages 13-19.

STATE REGISTRATION

Students completing either the degree or basic curriculum in professional nursing are eligible at the age of twenty years to take the state board examination given by the Minnesota State Board of Nurse Examiners. Successful passing of this examination entitles the nurse to registration in Minnesota and makes her eligible for membership in her alumnae association and, through her district and state association, in the national nursing organization and the Red Cross Nursing Service. Graduates from the University of Minnesota School of Nursing are also eligible for registration in any part of the United States. (Those desiring registration in New York state must have completed two years of science in high school.)

B. CURRICULUM IN PROFESSIONAL NURSING FOR COLLEGE GRADUATES

Applicants with a Bachelor's degree from an accredited college or university are admitted to a two- and one-half year program leading to the degree of graduate in nursing.

Students who wish, in addition to the basic curriculum, to complete a major in Nursing Education or in Public Health Nursing should follow the program listed for the graduate nurses in either of these fields. For Nursing Education see pages 29-37. For Public Health Nursing see the Bulletin of the School of Public Health. These majors in most cases would take an additional three quarters on the campus (exemption is granted in these programs for courses previously credited on the record of advanced standing.)

ADMISSION

Application for admission should be made in writing to the Dean of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota.

Applicants are admitted directly to the School of Nursing. Each applicant must file with the dean of admissions and records an application blank and an official copy of her college credits from the college from which she graduated.

OUTLINE OF CURRICULUM

Students accepted for this curriculum spend one quarter on the campus taking the classes listed below:

First Year—First Quarter

Anatomy 3	Home Economics 31* or 30 or Nursing 10
Physiology 50*	Public Health 3
Physiology 60*	Nursing 12
Bacteriology 53*	Nursing 1

The students may be exempt from any of the above required courses for which the Office of Admission and Records allows advanced standing on the basis of previous college credits in the courses.

* Applicants who have not had Zoology and Inorganic Chemistry, which are prerequisites to these courses, may need to take prenursing college work before entering.

At the end of the quarter on the campus, the students in this program are assigned to the University of Minnesota Hospitals for their major clinical experience.

The remainder of their program (nine quarters) corresponds to that of the student in the degree curriculum (see pages 14-15).

They are, however, eligible for the degree of graduate in nursing at the end of their two and one-half year program. They are also eligible for membership in the School of Nursing Alumnae Association and, upon passing the State Board examinations, are eligible for registration in the state of Minnesota.

SCHEDULE OF HOURS, VACATION

The hours of class work and clinical experience and the schedules of vacation time for the college graduate in the curriculum in professional nursing are comparable to those of the students in the degree curriculum during the ten quarters they are in the School of Nursing. (See page 19).

ESTIMATE OF FEES

The estimate of total fees for this curriculum is comparable to that given for the ten quarters in the School of Nursing of the degree curriculum (see pages 20, 21). The total estimate is $651.65 for the entire program not including incidentals, clothing, or vacation expenses.

HOUSING AND STUDENT ACTIVITIES

During the first quarter students in this curriculum provide their own maintenance. When space permits those who wish are allowed to live in Powell Hall, the nurses' residence, during the first quarter but they pay a reasonable rent for their rooms and are not furnished board. Room and board after the first quarter are furnished by the hospitals of residence (see page 22). .

Students in this curriculum have opportunity to participate in the same campus and School of Nursing activities as do the students in the degree curriculum (see page 22). Individuals in this group who meet the specific requirements of the societies are eligible for election to Alpha Tau Delta and Sigma Theta Tau.

SCHOLARSHIPS, LOANS, PRIZES

See page 23.

HEALTH REGULATIONS

Upon entrance the applicant must pass satisfactorily the physical examination including dental examination given by the Students' Health Service. Students whose condition needs further observation may be admitted tentatively but must cancel if later findings prove them physically unfit for nursing. The increasing emphasis on the maintenance of health and the prevention of disease necessitates that the nurse herself be physically fit. Each student is required to be vaccinated against smallpox and to be immunized against typhoid fever and diphtheria *before entering the school.*

For other health regulations see pages 24, 25.

GENERAL REGULATIONS

The regulations governing the college graduate in the basic professional nursing curriculum are the same as those governing the degree student in the School of Nursing in the matter of grades, continuation in the school, readmission, and leave of absence. See pages 25, 26.

REQUIREMENTS FOR GRADUATION

The Board of Regents of the University of Minnesota upon recommendation of the faculty of the School of Nursing confers the degree of graduate in nursing upon those students who held a B.S. or B.A. degree at time of entrance to the School of Nursing and who subsequently completed satisfactorily the two and one-half year curriculum indicated on the preceding pages.

STATE REGISTRATION

Graduates of this curriculum are eligible at the age of twenty years to take the state board examination given by the Minnesota State Board of Nurse Examiners. Successful passing of this examination entitles the nurse to registration in Minnesota and makes her eligible for membership in her alumnae association and, through her district and state association, in the national nursing organization and the Red Cross Nursing Service. Graduates from the University of Minnesota School of Nursing are also eligible to apply for registration in any part of the United States. (Those desiring registration in New York state must have completed two years of science in high school.)

II. Advanced Professional Curricula for Professional Nurses

The School of Nursing of the University of Minnesota with the cooperation of the College of Education and School of Public Health offers various programs for the graduate nurse who wishes to prepare herself further for some special field in nursing. The curricula listed in this section all lead to the degree of bachelor of science. The three fields of major emphasis available are:

A. Nursing Education
B. Advanced Clinical Courses in Medical, Surgical, Pediatric, Communicable Disease, Obstetrics, Tuberculosis, Operating Room, Psychiatric, and Rural Nursing. (For certificate courses in these fields see pages 39-47).
C. Public Health Nursing

ADMISSION

Applicants for admission to the nursing education or advanced clinical curricula must submit evidence of graduation from an accredited high school and an approved school of nursing. Application blanks on which the high school and nursing records should be submitted may be obtained from Dean of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota. Applicants are required to take a college aptitude test before they can be considered for admission. If the applicant has attended an accredited college or university, an official transcript of work taken should also be submitted. In some cases applicants with a year or more of satisfactory college work need not take the college aptitude test. Applications and transcript should be sent direct to the Dean of Admissions and Records, Administration Building, University of Minnesota, Minneapolis 14, Minnesota.

Final approval for admission is made by the admissions committee of the School of Nursing. Applicants whose previous academic record, nursing school record, and scholastic aptitude test scores indicate ability to carry the program will be admitted to the advanced professional curricula and will register in the College of Education. They must pass the health examination of that college. Advanced standing credit for the professional nursing courses will be determined by the committee on evaluation of nursing credentials which will indicate any additional clinical services to be completed before credit is granted. Arrangements for completion of any required additional clinical services should be made

through the School of Nursing. Deficiencies in clinical experience should be cleared as early as possible. Deficiencies in a field related to that of the curriculum chosen must be cleared before the beginning of the junior year and all deficiencies should be cleared before the senior year. Forty-five credits represent approximately the amount of advanced standing granted for a satisfactory course of study in a hospital school of nursing; 53 in a hospital school having its prenursing sciences taught in the University of Minnesota, 55 in other university schools, and 60 in the University of Minnesota School of Nursing. Students who have advanced standing amounting to 45 quarter credits are admitted to the sophomore year.

For admission as an "Adult Special Student" see the Bulletin of General Information.

Admission to the course in Public Health Nursing leading to a bachelor of science degree follows approximately the same procedure. However, applicants who wish to register in the School of Public Health should consult the Bulletin of the School of Public Health for specific requirements and procedures for admission.

ADVANCED STANDING CREDIT FOR VETERANS

Registered professional nurses who served in the armed forces should consult with the Bureau of Veterans' Affairs on the University campus. Veterans who wish to learn of the possibilities for earning service-connected advanced standing credit, as for example through the General Education Development Tests, should explore the opportunities before the initial registration is completed. Unless this is done, it is not always possible to take full benefit of the opportunities.

OUTLINE OF CURRICULA

A. Nursing Education

Major adviser: Professor Katharine J. Densford

Students registered in the College of Education must conform to the College of Education regulation relative to total credits and honor points. Candidates must also meet the graduation requirements of the College of Education. (See College of Education Bulletin.) They are, however, exempt from Public Health 4 and 59 of the Health Education requirement.

To secure a degree in the College of Education students must earn 185 credits and 185 honor points, and 1½ honor points for each credit in a major field. (See College of Education Bulletin.) In the advanced professional curricula in nursing, the major field in which the student must have a C+ average includes the required courses listed from the departments of Education, History of Education, Methods and Directed Teaching, and Nursing Education. At least 45 credits and honor points must be earned in residence in the College of Education at the University of Minnesota of which 30 must be in the senior year.

Students may enter the program at the beginning of any university quarter. Certain courses of the senior year, however, are not given every quarter. This should be taken into consideration in planning the program of the senior year.

Students who have advanced standing amounting to approximately 45 quarter credits from their school of nursing work are admitted to the sophomore year. A suggested sequence of courses for the graduate nurse who has approximately 45 advanced standing credits allowed for her school of nursing curriculum (one academic year) follows. (Chemistry and zoology are highly recommended as electives. Zoology is prerequisite to Physiology 60.) All other courses listed below are required unless substitutions are approved by the major adviser to meet the special needs of individual students.

SOPHOMORE YEAR

Course No.	Title	Credits
Comp. 4-5-6	Freshman Composition (or Eng. A-B-C or Com. 1-2-3 or exemption)	9
Chem. 1-2 or 4-5 or 6-7	General Inorganic Chemistry	8–10
Zool. 1-2-3	General Zoology	10
Soc. 1	Introduction to Sociology	5
	Physical Education	5
	Electives to total approximately 45 credits in addition to Physical Education	

JUNIOR YEAR

Psy. 1-2	General Psychology	6
To be chosen	Physiological Chemistry or Physiology or Human Anatomy or Bacteriology	4–6
C.W. 80	Child Psychology (or C.W. 40)	3
Soc. 49	Social Problems	3
Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 60	Ward Administration	4
	Electives to total 45 credits	

SENIOR YEAR

Ed. 51B	Introduction to Secondary School Teaching	3
Ed.T. 51A, B†	Special Methods of Teaching and Directed Teaching in Schools of Nursing	8
Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Hist.Ed. 180	The School and the Social Order	2
	General electives to total 45 credits	

The proper choice of electives in this curriculum enables the qualified student to complete one of the special variants of the degree curriculum in professional nursing (see pages 16-18) or to work toward a certificate in public health nursing. Graduate nurses who elect the ward administration variant are expected to arrange their programs so that Nursing 67 follows Ed.T. 51A, B.

Graduate nurses preparing for personnel and guidance positions should plan to take graduate work in that field, but should select certain electives in the bachelor of science program which serve as preparation for graduate study. Attention is called to offerings in other colleges of the University in the field of personnel work.

B. Advanced Clinical Curricula for Professional Nurses (Degree Courses)

This nine-quarter program leading to a bachelor of science degree is designed for those students who wish to include in their curriculum advanced study in one of the clinical fields. In terms of the customary four-year academic curricula leading to a bachelor of science degree in the College of Education, the freshman year credits in the following curricula may be considered earned by the advanced standing credits allowed for the school of nursing basic course previously completed; the second, or sophomore, year in these curricula consists of certain required courses and electives chosen with the field of interest in mind; in the junior year the student may choose advanced clinical study in any one of the following services:

(1) Medical nursing
(2) Obstetric nursing
(3) Operating room nursing
(4) Pediatric nursing
(5) Pediatric and communicable disease nursing
(6) Psychiatric nursing
(7) Rural hospital nursing
(8) Surgical nursing
(9) Tuberculosis nursing

† Requirements for registration in Ed.T. 51A are as follows:
1. A passing grade in Ed. 51A,B.
2. Passing of the qualifying examination in English.
3. Attainment of a scholastic average of 1.5 in the field in which the practice teaching is to be done.
4. Passing of the required speech test.

For description of type of clinical experience included see pages 15 and 37. The senior year consists of a common program of required courses for all variants but with opportunity for continued specific emphasis in the major field of interest.

Clinical experience is chosen to meet the needs and major interests of each student. The hourly schedule of experience is planned on an individual basis to provide the best possible clinical opportunities compatible with the schedule of academic classes. Clinical courses include patient care, lectures, conferences, seminars, and tours, as well as observation or participation in work of the out-patient department, nursery schools, settlement houses, community health agencies, special hospitals, parent study groups, and other community organizations. Clinical study is intended to emphasize scientific principles and the art of applying them to the problems of health and illness.

Altho the student's program is modified in consideration of the interests and needs of the individual student, certain required courses are included in all the variants unless they have been completed prior to the time of enrolment. The following outline includes suggested content of all clinical curricula.

SOPHOMORE YEAR

All Major Fields

Fall Quarter

Course No.	Title	Credits
Nat.Sci. 1	Orientation to the Natural Sciences	5
Com. 1	Communication	3
Soc.Sci. 1	Introduction to Social Science	4
Elective*	Elective*	3
	Physical Education	
		15

Winter Quarter

Nat.Sci. 2	Orientation to the Natural Sciences	5
Com. 2	Communication	3
Soc.Sci. 2	Introduction to Social Science	4
Psy. 1	General Psychology	3
	Physical Education	
	Total	15

Spring Quarter

Com. 3	Communication	3
Soc.Sci. 3	Introduction to Social Science	4
Psy. 2	General Psychology	3
P.H. 100	Elements of Preventive Medicine and Public Health	5
	Physical Education	
	Total	15

JUNIOR YEAR

Medical Nursing

Fall Quarter

Course No.	Title	Credits
Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Electives*	5
	Physical Education	
	Total	15

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than those in Nursing Education.

Winter Quarter

Course No.	Title	Credits
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 33A	Advanced Medical Nursing with directed experience	6
	Electives*	5
	Total	15

Spring Quarter

Physiol. 60	Human Physiology	6
Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 33B	Advanced Medical Nursing with directed experience	6
	Total	15

Obstetric Nursing

Fall Quarter

Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Electives*	5
	Physical Education	
	Total	15

Winter Quarter

P.H. 58	Maternal and Child Hygiene	3
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 34A	Advanced Obstetric Nursing with directed experience	6
	Electives*	2–3
	Total	15–16

Spring Quarter

Physiol. 60	Human Physiology	6
Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 34B	Advanced Obstetric Nursing with directed experience	6
	Total	15

Operating Room Nursing

Fall Quarter

Course No.	Title	Credits
Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
Nurs.Ed. 55	Aseptic Technic Nursing	1
	Electives*	4
	Physical Education	
	Total	15

Winter Quarter

Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 40A	Advanced Operating Room Nursing with directed experience	6
	Electives*	3
	Total	16

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than Nursing Education.

Spring Quarter

Nurs.Ed. 56	Operating Room Administration	2
Nurs.Ed. 40B	Advanced Operating Room Nursing with directed experience	6
Physiol. 60	Human Physiology	6
	Total	14

Pediatric Nursing

Applicants for the course in pediatric nursing are required to have completed a minimum of six weeks in pediatric and four weeks in communicable disease nursing in their basic nursing curriculum. Students who have not met this requirement must remove the deficiency before the beginning of the junior year.

Fall Quarter

Course No.	Title	Credits
C.W. 80	Child Psychology or Behavior Problems in Younger Children (C.W. 140)	3 or 2
Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
ArtEd. 33	General Handcrafts	3
	Physical Education	
	Total	16–15

Winter Quarter

P.H. 108	Care of the Handicapped Child	2
Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 61A	Advanced Pediatric Nursing with directed experience	6
	Total	15

Spring Quarter

C.W. 132	Later Childhood and Adolescence	3
Physiol. 60	Human Physiology	6
Nurs.Ed. 61B	Advanced Pediatric Nursing with directed experience	6
	Total	15

Pediatric and Communicable Disease Nursing

Applicants for the course in pediatric and communicable disease nursing are required to have completed a minimum of six weeks in pediatric and four weeks in communicable disease nursing in their basic nursing curriculum. Students who have not met this requirement must remove the deficiency before the beginning of the junior year.

Fall Quarter

Course No.	Title	Credits
Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
C.W. 80	Child Psychology	3
	Electives*	2–3
	Physical Education	
	Total	15–16

Winter Quarter

P.H. 108	Care of the Handicapped Child	2
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 37A	Advanced Pediatric and Communicable Disease Nursing with directed experience	6
Ed. 51A	Introduction to Secondary School Teaching	3
	Total	15

* Approval of the major adviser is necessary for the elective. The electives are to be selected from courses other than Nursing Education.

Spring Quarter

Course No.	Title	Credits
C.W. 132	Later Childhood and Adolescence	3
Nurs.Ed. 37B	Advanced Pediatric and Communicable Disease Nursing with directed experience	6
Physiol. 60	Human Physiology	6
	Total	15

Psychiatric Nursing

Applicants for the course in psychiatric nursing are required to have had a minimum experience of three months or the equivalent in psychiatric nursing either as a student or graduate nurse. This requirement must be met by the beginning of the junior year.

Fall Quarter

Psy. 144	Abnormal Psychology	3
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Electives*	7
	Physical Education	
	Total	15

Winter Quarter

Psy. 145	Abnormal Psychology	3
Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 29A	Advanced Psychiatric Nursing with directed experience	6
	Electives*	3
	Total	15

Spring Quarter

Nurs.Ed. 29B	Advanced Psychiatric Nursing with directed experience	6
Physiol. 60	Human Physiology	6
	Electives*	3
	Total	15

Rural Hospital Nursing

Fall Quarter

Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Ed. 51A	Introduction to Secondary School Teaching	3
Soc. 110	Rural Community Organization	3
Bact. 53	General Bacteriology	5
Nurs.Ed. 66A	Introduction to Advanced Clinical Nursing	3
	Physical Education	
	Total	17

Winter Quarter

Ed. 51B	Introduction to Secondary School Teaching	3
Nurs.Ed. 73	Principles of Economics in Nursing Service Administration	1
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 162	Personnel Work in Schools of Nursing	3
P.H. 125	The Community Health Education Pattern	3
	Total	14

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than Nursing Education.

Spring Quarter

Course No.	Title	Credits
Soc. 14	Rural Sociology	3
Ed.T. 51A	Special Methods of Teaching and Directed Teaching in Schools of Nursing	4
Physiol. 60	Human Physiology	6
Hist.Ed. 180	The School and the Social Order	2
	Total	15

Surgical Nursing

Fall Quarter

Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Electives*	5
	Physical Education	
	Total	15

Winter Quarter

Nurs.Ed. 52A	Advanced Surgical Nursing with directed experience	6
Nurs.Ed. 65	Analysis of Nursing Care	4
	Electives*	5
	Total	15

Spring Quarter

Physiol. 60	Human Physiology	6
Ed. 51A	Introduction to Secondary School Teaching	3
Nurs.Ed. 52B	Advanced Surgical Nursing with directed experience	6
	Total	15

Tuberculosis Nursing

Applicants for the course in tuberculosis nursing are required to have satisfactorily completed a basic course in tuberculosis nursing including clinical experience. Students who have not met this requirement must remove the deficiency before the beginning of their junior year.

Fall Quarter

P.H. 60	Tuberculosis and Its Control	2
Ed. 51A	Introduction to Secondary School Teaching	3
Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Physical Education	
	Total	15

Winter Quarter

(University Campus and Minneapolis Hospitals)

Nurs.Ed. 65	Analysis of Nursing Care	4
P.H. 133	Mental Hygiene Aspects of Public Health Nursing	3
Nurs.Ed. 47A	Advanced Tuberculosis Nursing with directed experience	6
	Electives*	2–3
	Total	15–16

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than Nursing Education.

Spring Quarter

(Glen Lake Sanatorium)

Course No.	Title	Credits
Nurs.Ed. 47B	Advanced Tuberculosis Nursing with directed experience	15
	Total	15

SENIOR YEAR

For all advanced clinical curricula except Rural Hospital Nursing

Fall Quarter

Nurs.Ed. 69	Survey of Conditions and Trends in Nursing	3
Hist. Ed. 180	The School and the Social Order	2
Ed. 51B	Introduction to Secondary School Teaching	3
	Electives	7
	Total	15

Winter Quarter

Ed.T. 51A	Special Methods of Directed Teaching in Schools of Nursing	4
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 73	Principles of Economics in Nursing Service Administration	1
Nurs.Ed. 162	Personnel Work in Schools of Nursing	3
	Electives	3
	Total	15

Spring Quarter

Ed.T. 51B	Special Methods of Directed Teaching in Schools of Nursing	4
Nurs.Ed. 67	Field Practice in Ward Administration	6
Nurs.Ed. 71	The Curriculum of the School of Nursing	3
	Electives	2
	Total	15

Rural Hospital Nursing

Fall Quarter

Nurs.Ed. 71	The Curriculum of the School of Nursing	3
Ed.T. 51B	Special Methods of Teaching and Directed Teaching in Schools of Nursing	4
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Electives	2–3
	Total	14–15

Winter and Spring Quarters

(Selected Rural Hospital)

Nurs.Ed. 46A, B	Advanced Course in Rural Nursing	24
Nurs.Ed. 67	Field Practice in Ward Administration	6
	Total	30

PUBLIC HEALTH NURSING

See Bulletin of the School of Public Health.

CLINICAL EXPERIENCE

In both the nursing education major and advanced clinical courses, projects in bedside care, supervision, administration, directed teaching, and similar areas are carried out at the University of Minnesota Hospitals, Charles T. Miller Hospital, and Minneapolis General Hospital. All of the programs also make use of additional community health and welfare facilities for providing broader opportunities of study.

SCHEDULE OF HOURS AND VACATIONS

Students in the nursing education and advanced clinical curricula have a weekly class schedule comparable to that of other students in the College of Education. In those courses which include clinical experience as part of the course, students have approximately two to three hours of clinical experience per week for each credit in the course. There are no hours on duty in the hospital except as a part of these courses.

Students have the same vacations and holidays as do other students on the University campus. (See Calendar on pages 2-3.) Schedules of classes are planned to allow for the period from the middle of June to October 1 as vacation. Individual programs can sometimes be accelerated or deficiencies removed by using the summer school period for class work, provided the required courses can be worked into the accelerated program satisfactorily.

ESTIMATE OF FEES FOR ADVANCED PROFESSIONAL CURRICULA

(Note: For fees in Public Health Nursing Major see Bulletin of School of Public Health.)

	One quarter	Total
Tuition (resident)*	$ 30.00	$ 270.00
Incidental fee	10.65	95.85
Course fee (estimate)	3.00	27.00
Laundry	30.00	270.00
Room rent	55.00	495.00
Board	128.00	1,152.00
Transportation	5.00†	40.00†
Books and instruments	20.00	180.00
Graduation fees	.....	7.50
	$281.65	$2,537.35

For explanation of fees see page 21, under fees for basic professional curricula.

PART-TIME EMPLOYMENT

Part-time employment in Minneapolis or St. Paul hospitals is occasionally available for graduate nurses attending the University. Application for such employment should be made to the Counseling and Placement Service, Minnesota Nurses' Assocation, 2642 University Avenue, St. Paul 4, Minnesota. The University Hospitals (on campus) can usually arrange for a limited number of graduate nurses who are attending the University to do special duty nursing in the hospitals on weekends or evening hours. Part-time work is also available in fields other than nursing through the Civil Service Personnel Office, University of Minnesota. Graduate nurses who are carrying a full program of class work are strongly urged not to carry outside employment. Students planning to accept part-time

* Nonresident tuition is $75.00 per quarter.

† This item is not a required fee but represents an estimated average of the cost of transportation to and from community health agencies, other community organizations and hospitals in the Twin Cities and nearby communities. Students in the advanced clinical curricula should include such an item in their planning. Students in the nursing education major do not have as much transportation expense in their program but should allow for some expense of this nature.

employment should consult their major adviser so that hours of employment do not interfere with time needed for conferences, field trips, etc. They should also consider the advisability of carrying less than the full academic load when carrying part-time employment.

ACHIEVEMENT TEST IN NURSING

In order to assist the school in evaluating the basic nursing knowledge of students in the advanced professional and certificate curricula, all accepted students will be asked to take certain achievement tests in nursing given by the National League of Nursing Education. The fee for these tests will be between $2 to $5 payable to the National League of Nursing Education. The tests will be given at the University of Minnesota in the week preceding the opening of the fall quarter each year. Students working toward the bachelor of science degree will be expected to take these tests by the beginning of their junior year. The results of the tests are to be used in student guidance and at the present time do not affect admission status. However, students whose scores show inadequate knowledge in the variant they have chosen (e.g., medical nursing, pediatric nursing, etc.) may be asked to audit classes in the subject given in the basic curriculum.

UNIFORMS

Students in the Advanced Clinical courses and in such courses as Directed Teaching and Ward Administration will be expected to be in uniform when having experience or observation in the care of patients. They will be responsible for supplying their own uniforms and for having them laundered.

HOUSING

Students in the advanced professional curricula provide their own maintenance throughout the nine quarters. They may secure rooms in Comstock Hall (the woman's dormitory) or in approved rooming houses near the University on the same basis as other university students. Because of the present housing shortage students should secure rooms as much in advance of arrival as possible. Those needing help in regard to housing should consult the Housing Bureau, Room 202 Eddy Hall, University of Minnesota, Minneapolis 14, Minnesota.

STUDENT ACTIVITIES

Students in the advanced professional curricula are encouraged to participate in University campus activities. Those who qualify are eligible for election to the two nursing societies and to any of the campus organizations. See "University Privileges" page 9 and the General Information Bulletin.

STUDENT COUNSELING

Students in the advanced professional curricula are urged to avail themselves of the counseling and personnel services of the University at any time during their attendance at the University and particularly in the first few quarters when special orientation problems often arise. The supervisor of the advanced clinical programs, the student counselor, and other faculty members in the School of Nursing are available for individual conferences when the need arises. Each new student is assigned a faculty adviser to assist in matters of registration and choice of courses. Attention is called to the general orientation and counseling program mentioned on page 9.

LOAN FUNDS

RICHARD OLDING BEARD LOAN FUND

The alumnae of the University of Minnesota School of Nursing have made available through the Endowment Fund a sum of $150 to be used as a loan to graduates of the school for further academic study. The recipient must have had one year of successful nursing experience following graduation.

MINNESOTA LEAGUE OF NURSING EDUCATION LOAN FUND

The Minnesota League of Nursing Education has made available the sum of $500 to be used as a loan to qualified graduate nurses for the purpose of further academic study.

OTHER SCHOLARSHIPS AND LOAN FUNDS

Many of the district and state nursing associations have established scholarships and loan funds for graduate nurses wishing to take university work. In Minnesota information concerning such a fund, the Sarah T. Colvin Loan Fund, may be had from the Minnesota Nurses' Association, 2642 University Avenue, St. Paul 4, Minnesota. Certain graduate nurses are also eligible for scholarships of the national nursing organizations. Among these are the Isabel Hampton Robb Memorial Scholarship Fund, under which scholarships are available annually, on a competitive basis, in the spring, and the McIsaac Loan Fund, available any time. Information concerning these may be had from Miss Julia Stimson, Horsechestnut Road, Briarcliff Manor, N.Y., the alumnae associations of many schools of nursing maintain loan funds and scholarships for the use of their members for further academic study.

HEALTH

Students in the advanced professional curricula are required to pass a physical examination at time of entrance to the University. This examination includes a Mantoux test for tuberculosis.

Before participating in any of the advanced clinical courses which include the care of the patient, students should be vaccinated against smallpox and immunized against typhoid fever and diphtheria. This can be done at the Students' Health Service if the student wishes.

While in the University students in the advanced professional curricula are entitled to advice and treatment in the Students' Health Service on the same basis as that of other university students. See General Information Bulletin. It should be noted that there are charges in connection with special services or hospitalization.

REQUIREMENTS FOR GRADUATION

The bachelor of science degree will be granted those graduate professional nurses who have completed satisfactorily the requirements for this degree as outlined on pages 28-36.

III. Certificate Curricula in Clinical Nursing for Registered Professional Nurses

ADMISSION

Applicants for admission to the certificate curricula in clinical nursing must submit evidence of graduation from an accredited high school and an approved school of nursing. They must also (1) have had one year of successful nursing experience since graduation

(not necessarily in the field in which the student now desires to study) and (2) have completed satisfactorily a course in general psychology and one in general sociology in an accredited college or university. The second requirement may be satisfied by (a) courses taken at the Unversity of Minnesota or other accredited college or university, (b) courses taken by correspondence through the University of Minnesota, (c) Extension (evening) class from the University of Minnesota in St. Paul or Minneapolis. These courses must be completed *before* admission to the certificate curricula.* Veterans may consult the Bureau of Veterans' Affairs, University of Minnesota, concerning the possibility of meeting a part of this requirement through General Educational Development Tests or similar opportunities.

High school records and nursing school records should be submitted on application forms which may be obtained from Dean of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota. An official transcript of all college credits earned in an accredited college or university should also be submitted. Applications and transcripts should be sent direct to Dean of Admissions and Records, Administration Building, University of Minnesota, Minneapolis 14, Minnesota, preferably several months in advance of desired date of entrance.

Applicants for the certificate course in pediatric nursing or in pediatric and communicable disease nursing are required to have completed a minimum of six weeks in pediatrics and four weeks in communicable disease in the basic nursing course. Students who cannot meet this requirement will need to take a supplementary course *before entrance* or to have had sufficient graduate nurse experience in the field to meet the requirement of the committee on evaluation of nursing credits.

Applicants for the certificate course in psychiatric nursing are required to have had a minimum experience of three months or its equivalent in psychiatric nursing either as a student or graduate nurse.

Applicants for the certificate course in tuberculosis nursing are required to have satisfactorily completed a basic course in tuberculosis nursing, including clinical experience, or have had sufficient graduate nurse experience in the field to have approval by the committee on evaluation of nursing credits.

ADMISSION--DATES

The certificate curricula in clinical nursing begin once each year at the beginning of the fall quarter in the University and are completed at the end of the spring quarter. See University Calendar, pages 2-3.

The only exception to this is the certificate course in advanced psychiatric nursing which begins twice a year, at the beginning of the fall and spring quarters.

Applicants are required to take a college aptitude test before they can be considered for admission. Final approval for admission is made by the admissions committee of the School of Nursing on the basis of previous academic record, nursing school record, and scholastic aptitude test scores. Admitted students are registered in the School of Nursing.

ADMISSION—ADVANCED STANDING CREDIT FOR VETERANS

Registered professional nurses who served in the armed forces should consult with the Bureau of Veterans' Affairs on the University campus. Veterans who wish to learn of the possibilities for earning service-connected advanced standing credit, as for example through the General Education Development Tests, should explore the opportunities before the initial registration is completed. Unless this is done, it is not always possible to take full benefit of the opportunities.

* Sociology and psychology are not required of students entering the certificate course in psychiatric nursing.

OUTLINE OF CERTIFICATE CURRICULA FOR PROFESSIONAL NURSES

MEDICAL NURSING

Fall Quarter

Course No.	Title	Credits
Bact. 53	General Bacteriology	5
P.H. 100	Elements of Preventive Medicine and Public Health	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Total	15

Winter Quarter

Nurs. 72	Principles of Learning and Methods of Teaching	3
Nurs.Ed. 33A	Advanced Medical Nursing with directed experience	6
Nurs.Ed. 60	Ward Administration	4
	Electives*	2–3
	Total	15–16

Spring Quarter

Physiol. 60	Human Physiology	6
Nurs.Ed. 33B	Advanced Medical Nursing with directed experience	6
Nurs.Ed. 65	Analysis of Nursing Care	4
	Total	16

OBSTETRIC NURSING

Fall Quarter

Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Electives*	5
	Total	15

Winter Quarter

P.H. 58	Maternal and Child Hygiene	3
Nurs.Ed. 34A	Advanced Obstetric Nursing with directed experience	6
Nurs.Ed. 72	Principles of Learning and Methods of Teaching	3
	Electives*	3
	Total	15

Spring Quarter

Phys. 60	Human Physiology	6
Nurs.Ed. 34B	Advanced Obstetric Nursing with directed experience	6
Nurs.Ed. 60	Ward Administration	4
	Total	16

OPERATING ROOM NURSING

Fall Quarter

Bact. 53	General Bacteriology	5
Nurs.Ed. 55	Aseptic Technic Nursing	1
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
P.H. 100	Elements of Preventive Medicine and Public Health	5
	Total	16

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than those in Nursing Education.

Winter Quarter

Course No.	Title	Credits
Nurs.Ed. 40A	Advanced Operating Room Nursing with directed experience	6
Nurs.Ed. 65	Analysis of Nursing Care	4
Nurs.Ed. 72	Principles of Learning and Methods of Teaching	3
	Electives*	2–3
	Total	15–16

Spring Quarter

Physiol. 60	Human Physiology	6
Nurs. Ed. 40B	Advanced Operating Room Nursing with directed experience	6
Nurs.Ed. 56	Operating Room Administration	2
	Electives*	1–2
	Total	15–16

Fourth Quarter (optional)†

A fourth quarter (an internship, without credit) may be elected by the student. During the quarter the student will have clinical experience approximately 42 hours per week in operating room teaching and administration. Six weeks of this quarter will be spent in the service or specialty elected by the student. Maintenance will be provided during this quarter.

PEDIATRIC NURSING

Fall Quarter

C.W. 40	Child Training	3
C.W. 80	Child Psychology	3
P.H. 100	Elements of Preventive Medicine and Public Health	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Total	16

Winter Quarter

P.H. 108	Care of the Handicapped Child	2
Nurs.Ed. 61A	Advanced Pediatric Nursing with directed experience	6
Nurs.Ed. 72	Principles of Learning and Methods of Teaching in Schools of Nursing	3
	Electives*	4–5
	Total	15–16

Spring Quarter

C.W. 132	Later Childhood and Adolescence	3
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 61B	Advanced Pediatric Nursing with directed experience	6
	Electives*	2–3
	Total	15–16

PEDIATRIC AND COMMUNICABLE DISEASE NURSING

Fall Quarter

C.W. 40	Child Training	3
C.W. 80	Child Psychology	3
P.H. 100	Elements of Preventive Medicine and Public Health	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Total	16

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than those in Nursing Education.

† This is not a required part of the curriculum leading to the certificate.

Winter Quarter

Course No.	Title	Credits
P.H. 108	Care of the Handicapped Child	2
Nurs.Ed. 37A	Advanced Pediatric and Communicable Disease Nursing with directed experience	6
Nurs.Ed. 72	Principles of Learning and Methods of Teaching in Schools of Nursing	3
	Electives*	4–5
	Total	15–16

Spring Quarter

C.W. 132	Later Childhood and Adolescence	3
Nurs.Ed. 37B	Advanced Pediatric and Communicable Disease Nursing with directed experience	6
Nurs.Ed. 60	Ward Administration	4
	Electives*	2–3
	Total	15–16

PSYCHIATRIC NURSING

Fall Quarter

Psych. A or 1 and 2	General Psychology	5–6
Soc. 1	Introduction to Sociology	5
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 72	Principles of Learning and Methods of Teaching	3
	Total	17–18

Winter Quarter

(Rochester State Hospital, Rochester, Minn.)†

Neuropsych. 171	Principles of Neuropsychiatry	3
Nurs.Ed. 57A	Field Practice in Psychiatric Nursing	7
Nurs.Ed. 59	Principles of Psychiatric Nursing	5
	Total	15

Spring Quarter

(Rochester State Hospital, Rochester, Minn.)†

Nurs.Ed. 57B	Field Practice in Psychiatric Nursing	15
	Total	15

RURAL HOSPITAL NURSING

Fall Quarter

(University Campus)

P.H. 100	Elements of Preventive Medicine and Public Health	5
Soc. 14	Rural Sociology	3
Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 66A	Introduction to Advanced Clinical Nursing	3
Nurs.Ed. 73	Principles of Economics in Nursing Service Administration	1
	Total	16

* Approval of the major adviser is necessary for the elective. These electives are to be selected from courses other than those in Nursing Education.

† Teaching during this period carried by School of Nursing faculty and staffs of Mayo Clinic and Rochester State Hospital.

Winter and Spring Quarters

(Selected Rural Hospitals)

Course No.	Title	Credits
Nurs.Ed. 46A, B	Advanced Course in Rural Nursing	24
Nurs.Ed. 67	Field Experience in Ward Administration	6
	Total	30

SURGICAL NURSING

Fall Quarter

Bact. 53	General Bacteriology	5
P.H. 100	Elements of Preventive Medicine and Public Health	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing	5
	Total	15

Winter Quarter

Nurs.Ed. 60	Ward Administration	4
Nurs.Ed. 52A	Advanced Surgical Nursing with directed experience	6
Nurs.Ed. 72	Principles of Learning and Methods of Teaching in Schools of Nursing	3
	Electives*	2–3
	Total	15–16

Spring Quarter

Phys. 60	Human Physiology	6
Nurs.Ed. 52B	Advanced Surgical Nursing with directed experience	6
Nurs.Ed. 65	Analysis of Nursing Care	4
	Total	16

TUBERCULOSIS NURSING

Fall Quarter

P.H. 60	Tuberculosis and Its Control	2
P.H. 100	Elements of Preventive Medicine and Public Health	5
Bact. 53	General Bacteriology	5
Nurs.Ed. 66	Introduction to Advanced Clinical Nursing with directed experience	5
	Total	17

Winter Quarter

(University Campus and Minneapolis Hospitals)

Nurs. 72	Principles of Learning and Methods of Teaching	3
P.H. 133	Mental Hygiene Aspects of Public Health Nursing	3
Nurs.Ed. 47B	Advanced Tuberculosis Nursing with directed experience	6
Nurs.Ed. 60	Ward Administration	4
	Total	16

Spring Quarter

(Glen Lake Sanatorium)

Nurs.Ed. 47C	Advanced Tuberculosis Nursing with directed experience	15
	Total	15

* Approval of the major adviser is necessary for the elective.

Fourth Quarter (optional)*

A fourth quarter (an internship, no credit) may be elected by the student. During the quarter the student will have 12 weeks of field practice (approximately 42 hours weekly) as follows:

1. Continued experience in ward administration and teaching for eight weeks in a selected unit and a four-week ward administration and teaching experience, in an elected unit, i.e., Children's Sanitorium or
2. Ten weeks of experience in collapse therapy and two weeks of experience in "Out-Patient Department."

Maintenance is provided during this quarter.

CLINICAL EXPERIENCE

In the certificate curricula in clinical nursing the major portion of clinical experience and observation of most programs is in the University Hospitals. The programs also make use of other hospitals, especially the Minneapolis General Hospital, the Charles T. Miller Hospital, Glen Lake Sanatorium, Rochester State Hospital, rural hospitals and other community health and welfare facilities for providing broader opportunities of study.

SCHEDULE OF HOURS AND VACATIONS

Students in the certificate curricula have a weekly class schedule comparable to that of other students in the College of Education. In those courses which include clinical experience as part of the course, students have approximately two to three hours of clinical experience per week for each credit in the course. There are no hours on duty in the hospital except as a part of these courses.

Students have the same vacations and holidays as do other students on the university campus. (See Calendar, pages 2-3.)

ESTIMATE OF FEES FOR CERTIFICATE CURRICULA FOR PROFESSIONAL NURSES

	One Quarter	Total
Tuition (resident)‡	$ 42.00	$126.00
Incidental fee	10.65	31.95
Course fee (estimate)	3.00	9.00
Laundry	30.00	90.00
Room rent	55.00	165.00
Board	128.00	385.00
Transportation	5.00†	15.00†
Books and instruments	20.00	60.00
	$293.65	$881.95

For explanation of fees see pages 20-22, under fees for basic professional curricula.

* This is not a required part of the curriculum leading to a certificate.

† This item is not a required fee but represents an estimated average of the cost of transportation to and from community health agencies, other community organization and hospitals in the Twin Cities and nearby communities.

‡ Nonresident tuition is $90.00 per quarter.

PART-TIME EMPLOYMENT

See pages 37-38.

ACHIEVEMENT TESTS IN NURSING

In order to assist the school in evaluating the basic nursing knowledge of students in the advanced professional and certificate curricula, all accepted students will be asked to take certain achievement tests in nursing given by the National League of Nursing Education. The fee for these tests will be between $2 and $5 payable to the National League of Nursing Education. The tests will be given at the University of Minnesota in the week preceding the opening of the fall quarter each year. Students in the certificate curricula will be expected to take the tests at the beginning of their program. The results of the tests are to be used in student guidance and at the present time do not affect admission status. However, students whose scores show inadequate knowledge in the variant they have chosen (e.g., Medical Nursing, Pediatric Nursing, etc.) may be asked to audit classes in the subject given in the basic curriculum.

UNIFORMS

Students in the certificate curricula will be expected to be in uniform when having experience or observation in the care of patients. They will be responsible for supplying their own uniforms and for having them laundered.

HOUSING

Students in the certificate curricula provide their own maintenance throughout the nine quarters. They may secure rooms in Comstock Hall (the woman's dormitory) or in approved rooming houses near the University on the same basis as other university students. Because of the present housing shortage, students should secure rooms as much in advance of arrival as possible. Those needing help in regard to housing should consult the Housing Bureau, 202 Eddy Hall, University of Minnesota.

STUDENT ACTIVITIES AND STUDENT COUNSELING

See pages 9, 38.

SCHOLARSHIPS AND LOAN FUNDS

See page 39.

HEALTH

Students in the certificate curricula are required to have a physical examination at time of entrance to the University of Minnesota. This examination includes a Mantoux test for tuberculosis.

Before participating in any of the clinical courses which include the care of the patient, students should be vaccinated against smallpox and immunized against typhoid fever and diphtheria. This can be done at the Students' Health Service after admission if the student wishes.

While at the University, students in the certificate curricula are entitled to advice and treatment in the Students' Health Service on the same basis as that of other university students. See *General Information Bulletin.* It should be noted that there are certain charges in connection with special services and hospitalization.

REQUIREMENTS FOR CERTIFICATE

Upon satisfactory completion of the requirements listed on pages 39-48 a certificate is issued to the student.

IV. Certificate Curriculum in Practical Nursing

Because of the need for a group of workers in the field of nursing of less technical and prolonged preparation than is required for professional nursing, the University of Minnesota School of Nursing is offering a four-quarter program (one full year) leading to a certificate in practical nursing. The purpose of the program is to prepare persons to give needed nonprofessional nursing service in general hospitals, both urban and rural, hospitals for the mentally ill and for the chronically ill, public health agencies and homes.

ADMISSION

Applicants must be high school graduates. Application should be made in writing to the dean of admissions and records. Application forms on which high school records should be submitted may be obtained from the Dean of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota.

Applicants may be either married or single and should be between 18 and 35 years of age. Those over 35 years of age will be considered on an individual basis. Applicants should submit a recommendation from the high school principal or counselor if they have not been out of high school more than two years. Those who have been out more than two years may submit recommendation from an employer or other suitable person.

Applicants must pass a physical examination given by the Students' Health Service at time of entrance.

ADMISSION—DATES

Applicants are admitted at the beginning of the *summer and winter quarters* only. The next entrance dates will be June 18, 1947, and January 5, 1948.

CURRICULUM

The course is four quarters in length (one full year) and operates on the regular university calendar.

The total number of class hours carried by students who satisfactorily complete this program is approximately 40. From 8 to 12 of these are credits earned in general education courses and from 28 to 32 are in nursing practice courses.* The nursing practice courses will include the following topics with 20 hours a week of appropriate supervised experience:

1. Health: how it is preserved and recovered. Illness: its meaning to patients, families, and communities. Main causes of disease, control of disease, medical treatment.
2. Bases of human behavior: own, co-workers, patients, patients' relatives, children.
3. The care of physically well persons: children, mothers with new babies, the aged, the mentally ill. Include study and leisure time occupation.
4. Nutrition and food preparation: food for the family, food for the sick.
5. Measures used in the care of the sick, including protection from harmful microorganisms and including suitable activities for occupation and diversion.

* The class hours in the nursing practice courses are applicable only toward the certificate in practical nursing and do not carry credit toward a Bachelor's degree. The general education courses carry regular university credit which under some circumstances might be used toward a degree.

6. Care of the home and the patient in the home. (Special emphasis in this unit should be placed on food for the family.)
7. Personal relationships in the home and hospital. Personnel practices. Participation in practical nurse organization activities.

SCHEDULE OF HOURS, VACATIONS, AND EXPERIENCE

The student carries a program throughout each of the four quarters which averages ten hours of class per week plus a maximum of twenty hours of supervised experience. (For arrangements for employment during the course in addition to the student program see Student Employment below. The supervised experience is scheduled at appropriate times throughout any day of the week. Neither class nor student experience is scheduled for university holidays or vacation periods. (See University Calendar, pages 2-3.)

Students will be assigned to the University of Minnesota Hospitals for the major portion of their supervised experience.

ESTIMATE OF FEES

	First Quarter	Total
Tuition (resident)‡	$30.00	$120.00
Incidental fee	10.65	42.60
Matriculation deposit	5.00	5.00
Books (estimate)	10.00	10.00
Uniforms (estimate)	32.00	32.00
	$87.65	$209.60

(Maintenance is not included in the above estimate.)

Incidental fee—An incidental fee of ten dollars and sixty-five cents ($10.65) a quarter is charged each student, for which the student receives privileges such as the Coffman Memorial Union, the Health Service, the *Minnesota Daily,* including the Official Daily Bulletin, and the university post-office service.

Matriculation deposit—At the student's first registration at the University a matriculation deposit of five dollars ($5) is required to cover the following charges: locker rental, locker key deposit, laboratory breakages, library fines, or damages to university property. Unused balance is refunded when student leaves the University.

Uniforms—A special uniform and cap is worn by the student while giving care to the patient. The students are responsible for the laundering of these uniforms.

Certificate—A distinguishing pin and certificate in Practical Nursing will be granted upon satisfactory completion of the curriculum.

MAINTENANCE AND STUDENT EMPLOYMENT

The student assumes responsibility for her own maintenance during the course. She may live at home if within easy commuting distance. Room and board may be had in university dormitories, nurses' residences, or approved local rooming houses at an approximate cost of $115 to $180 per quarter. For information about housing, write to the Housing Bureau, 202 Eddy Hall, University of Minnesota, Minneapolis 14.

Students who wish to work for tuition or maintenance may be employed in the hospital or other employment (not to exceed 21 hours a week) at the prevailing hourly wage for university students engaged in similar work (present rate is 58 cents per hour). Room and board for students employed in the hospital is furnished in the nurses' residences.

‡ Nonresident tuition is $75 per quarter.

HEALTH REGULATIONS

Students in this curriculum are entitled to the same privileges for health care as are other university students. This includes an entrance physical examination by the Students' Health Service and opportunity for advice and treatment at the Health Service (see General Information Bulletin). It should be noted that there are charges in connection with special service or hospitalization.

Before entering the School of Nursing students should be vaccinated for smallpox and immunized against diphtheria and typhoid fever.

STUDENT ACTIVITIES

As regularly enrolled students in the University of Minnesota, students in the curriculum for practical nursing may participate in student activities of various kinds and enjoy the same university privileges as do other students. See page 22.

Description of Courses

The following courses are taught by members of the School of Nursing faculty and cooperating faculty from other departments. Class hours, days, and rooms for these courses are posted on the School of Nursing bulletin board, 125 Medical Sciences building, at the beginning of each quarter. For summer class schedule see Summer Session Bulletin.

The descriptions of the required courses and electives in the various curricula, which are taught by other departments of the University, will be found in the University of Minnesota Combined Class Schedule and in the Bulletins of the College of Science, Literature, and the Arts, and the College of Education.

Neuropsych. 171w,s,su. Principles of Neuropsychiatry. This course deals with the diagnosis, treatment, nursing care, and prevention of (a) neurological disorders; and (b) organic and functional psychoses, with emphasis upon the relation of personality disorders to physical disorders, to family and community problems, etc. Lectures, clinics, ward nursing classes, case study conferences, demonstration, and excursion. (4 cred.; 44 hrs.)

Nurs. 1f,w,s. History of Nursing. A brief historical survey of nursing serving as a basis for study of problems of the present day. (1 cred.; 11 hrs.)

Nurs. 10f,s. Introduction to Nutrition. A course dealing with food and its relation to the human body; the processes by which the body utilizes food; the study and classification of the various foods together with the caloric index. The normal diet and routine hospital diets are given with directions for modification under special circumstances. (1 cred.; 11 hrs.)

Nurs. 11A-Bw,su. Foods and Nutrition. Laboratory and lecture course in practical dietetics, food preparation together with methods of cookery; definite instruction in carrying out the dietary prescription is given. (11A, 1 cred., 11 hrs.; 11B, 2 cred.; 44 hrs.)

Nurs. 12f,s. Introduction to Nursing. An elementary course designed to prepare students for the clinical period. (3 cred.; 44 hrs.)

Nurs. 13w,su. Introduction to Public Health. A course planned to orient the student to an understanding of the patient as a person; the relative importance of hospitalization in his maintenance of health; and the organization of the community as a whole to meet its social and health needs. Application of above principles to be made through guided interviews with the patient. (2 cred.; 22 hrs.)

Nurs. 14f,w,su. Introduction to the Medical Sciences. This course attempts to integrate the information which the student has learned in the physical and social sciences and focus it upon the patient in his relation to nurse, doctor, and community. It considers the general nature and causes of disease, structural and physiological manifestations of general disease processes, and various methods used in the diagnosis of disease. 2 cred.; 22 hrs.)

Nurs. 15A,15Bw,s,su; 16f,s. Nursing Arts. A course presenting the principles of nursing, demonstrating the application of principles from the foundation sciences in the care of the patient and in observation of symptoms and conditions. Nurs. 15A (3 cred.; 33 hrs.) Nurs. 15B consists of 44 hours of practice of basic nursing procedures. (2 cred.) Nurs. 16 includes the more advanced nursing procedures and 22 hours of practice. (2 cred.) (Total 7 cred.; 99 hrs.)

Nurs. 18w,su; 19f,s. Principles of Medical and Surgical Nursing. A course designed to give a knowledge of the causes, symptoms, treatment, and prevention of abnormal medical and surgical conditions including the medical and nutrition aspects and nursing care

of patients with these conditions. Nursing 18 includes general consideration of causes and treatment of disease, conditions of the respiratory tract, conditions of the gastro-intestinal tract, including oral hygiene, surgical conditions of the integumentary system, and conditions of the liver and gall bladder. Nurs. 19 is devoted to study of the endocrine glands, of the circulatory system, surgical conditions of the nervous system, and of the urinary system. (8 cred.; 88 hrs.)

Nurs. 20f,s. Principles of Nursing in Conditions of the Skin. Lectures, class, demonstrations, and clinics present the etiology, symptomatology, treatment, and nursing care of disorders of skin and closely related tissues. Emphasis is placed upon prevention of skin disorders and upon the mental hygiene, social, and economic aspects of treatment. (1 cred.; 11 hrs.)

Nurs. 21w,s. Principles of Medical and Surgical Nursing. A continuation of Nursing 18 and 19. This course includes lectures, classes, and demonstrations of conditions of ear, nose, and throat, allergies, arthritis, and geriatrics including preventive, economic, and social aspects. (2 cred.; 22 hrs.)

Nurs. 25f,s. Principles of Orthopedics and of Orthopedic Nursing. Lectures, classes, and clinics dealing with orthopedic conditions including fractures and amputations. Emphasis is laid upon the preventive, economic, and social aspects of these conditions. Treatment (including physical therapy) and nursing care are stressed. (2 cred.; 22 hrs.)

Nurs. 35f,w,s,su. Principles of Communicable Disease Nursing. Lectures, classes, and demonstrations on the etiology, symptoms, treatment, and nursing care of communicable diseases, including tropical diseases, with emphasis on their significance to public health and on preventive measures. (2 cred.; 22 hrs.; hrs. and days ar. during experience.)

Nurs. 36f, w,s,su. Principles of Tuberculosis and Tuberculosis Nursing. Lectures, classes, clinics, and demonstrations presenting the etiology, pathogenesis, treatment, and nursing care of the disease with emphasis on the epidemiology and the socio-economic aspects—especially case finding, prevention and rehabilitation. (2 cred.; 22 hrs.; hrs. and days ar. during experience.)

Nurs. 41f,w,s,su. Principles of Pediatrics and Pediatric Nursing. Lectures, classes, clinics, and demonstrations on the development (social, emotional, mental, and physical) of the normal child as a member of the family and community, on the diseases of infancy and childhood, on treatment, care, feeding, and guidance of the child. Movements for the promotion of child health. (3 cred.; 33 hrs.)

Nurs. 42f,w,s,su. Principles of Nursing in Obstetrics and Gynecology. This course consists of lectures, classes, demonstrations, and clinics on etiology, symptoms, treatment, and prevention of abnormal conditions of the female reproductive system. Also instruction in the physiology, pathology, and hygiene of pregnancy, labor, puerperium, and care of newborn infants. The psychological and public health aspects of these conditions are stressed. (3 cred.; 33 hrs.)

Nurs. 44f,w,s,su. Observation of the Normal Child. A course intended to orient students to procedures in the nursery school with special emphasis on normal growth, development, and behavior. It includes classes, observations, and staff conferences. (1 cred.; 11 hrs.)

Nurs. 45f,w,s,su. First Aid. American Red Cross standard course. (1 cred.; 22 hrs.)

Nurs. 49f,w,s,su. Principles of Care in Eye Conditions. A course for the study of eye conditions with emphasis on sight conservation, and nursing care of common eye diseases, their prevention and treatment. (1 cred.; 11 hrs.)

Nurs. 50f,w. Professional Adjustments. A course dealing with present-day problems of nursing—legal, economic, civic, legislative. A survey of fields of nursing and of related health movements. (2 cred.; 22 hrs.)

Nurs. 53f,w,su. Field Practice in Public Health Nursing. Classes and conferences taken during six weeks of experience in Public Health Nursing. For students in degree curriculum. (1 cred.; 11 hrs.)

NURSING EDUCATION COURSES

Ed.T. 51Af,w,su,Bf,w,s.‡ Special Methods of Teaching and Directed Teaching in Schools of Nursing. Principles underlying clinical and classroom teaching in schools of nursing. Planning and evaluation of instruction. Observation and study of principles of teaching applied in the nursing school situation. Supervised practice in teaching of nursing subjects. (8 cred.)

Nurs.Ed. 28w,s. Observations in Psychiatric Nursing. A course planned to supplement experience in psychiatric nursing and to meet individual needs. Includes survey of psychiatric nursing; emphasizes scientific care, treatment, diagnosis, prophylaxis, rehabilitation, psychosomatic and social aspects of patient care in hospitals and community agencies. Classes, individual conferences, clinics and observations in areas of psychiatric practice. Open only to a special group of students detailed from Veterans Administration neuropsychiatric hospitals. (2 cred.)

Nurs.Ed. 29Aw,Bs. Advanced Psychiatric Nursing. A course providing for guided study of principles, technics, and problems of psychiatric nursing. Doctors' and nurses' lectures, conferences, seminars, demonstrations, clinics, and ward classes supplemented by correlated clinical assignments. Emphasis is given scientific principles, social and economic implications and community programs for promotion of mental health and for disease control as related to highest quality of patient care. Clinical assignments include experience in bedside patient care, in special diagnostic and therapeutic techniques, and in community agency activities. Individual student interests, needs, and abilities are recognized in planning content of the course. (12 cred.)

Nurs.Ed. 33Aw,Bs. Advanced Medical Nursing. A course providing for guided study of principles, technics, and problems of medical nursing. Doctors' and nurses' lectures, conferences, seminars, demonstrations, clinics, and ward classes supplemented by correlated clinical assignments. Emphasis is given scientific principles, social and economic implications and community programs for disease control as related to highest quality of patient care. Clinical assignments include experience in bedside patient care, in special diagnostic and therapeutic techniques, and in community agency activities. Individual student interests, needs, and abilities are recognized in planning content of the course. (12 cred.)

Nurs.Ed. 34Aw,Bs. Advanced Obstetric Nursing. A course providing for guided study of principles, technics, and problems of obstetric nursing. Doctors' and nurses' lectures, conferences, seminars, demonstrations, clinics, and ward classes supplemented by correlated clinical assignments. Emphasis is given scientific principles, social and economic implications and community programs for disease control as related to highest quality of patient care. Clinical assignments include experience in bedside patient care, in special diagnostic and therapeutic techniques, and in community agency activities. Individual student interests, needs, and abilities are recognized in planning content of the course. (12 cred.)

Nurs.Ed. 37Aw,Bs. Advanced Pediatric and Communicable Disease Nursing. A course providing for guided study of principles, technics, and problems of pediatric and communicable disease nursing. Doctors' and nurses' lectures, conferences, seminars, demonstrations, clinics, and ward classes supplemented by correlated clinical assignments. Emphasis is given scientific principles, social and economic implications and community programs for disease control as related to highest quality of patient care.

‡ A fee of $1 per credit is charged for this course.

Clinical assignments include experience in bedside patient care, in special diagnostic and therapeutic techniques, and in community agency activities. Individual student interests, needs, and abilities are recognized in planning content of the course. (12 cred.)

Nurs.Ed. 40Aw,Bs. Advanced Operating Room Nursing. A course providing for guided study of principles, technics, and problems of operating room nursing. Lectures, demonstrations, conferences, classes, readings and experience. 40A. Experience designed to form a background of general knowledge in nursing related to all types of operative procedures. 40B. Experience designed to provide an opportunity to acquire more detailed knowledge and some degree of skill in nursing related to operative procedures. (12 cred.)

Nurs.Ed. 46Aw,Bs. Advanced Course in Rural Nursing. Organized instruction and clinical experience in rural hospital nursing including: home and hospital deliveries, care of the newborn, obstetric anesthesia, operating room experience, and participation in the local school health program. (24 cred.)

Nurs.Ed. 47Aw,Bs. Advanced Tuberculosis Nursing. Nurses' and doctors' lectures, conferences and ward classes supplemented by correlated clinical assignments. Emphasis is given scientific principles, social and economic implications and community programs for disease control as related to highest quality of patient care. Clinical assignments include experience in bedside patient care, in special diagnostic and therapeutic techniques, and in community agency activities. 47B includes study of rehabilitation, occupational therapy, education of patients and family, orientation of personnel to job, collapse therapy, etc. Individual student interests, needs, and abilities are recognized in planning the course content. (21 cred.)

Nurs.Ed. 52Aw,Bs. Advanced Surgical Nursing. A course providing for guided study of principles, technics, and problems of surgical nursing. Doctors' and nurses' lectures, conferences, seminars, demonstration, clinics, and ward classes supplemented by correlated clinical assignments. Emphasis is given scientific principles, social and economic implications and community programs for disease control as related to highest quality of patient care. Clinical assignments include experience in bedside patient care, in special diagnostic and therapeutic techniques, and in community agency activities. Individual student interests, needs, and abilities are recognized in planning content of the course. (12 cred.)

Nurs.Ed.55f. Operative Aseptic Technique. A course dealing with the type of organization and the personnel of the operating room; the care and use of equipment; antiseptics and methods of sterilization; special and routine procedures; and problems of co-ordination with other hospital departments. Taught by lectures, demonstrations, discussion, and field trips. (1 cred.; 11 hrs.)

Nurs.Ed. 56s. Operating Room Administration. A course dealing with the administration and management of an operating room. Taught by lecture, discussion, and field trips. (2 cred.; 22 hrs.)

Nurs.Ed. 57A,B. Field Practice in Psychiatric Nursing. Nurses' and doctors' lectures, conferences and seminars supplemented by special studies, projects, and clinical assignments. Instruction in the use of special therapies such as shock therapy, hydrotherapy, occupational and recreational therapies; observation of brain surgery and psychotherapy; discussion of such topics as psychometrics and psychology of food and feedings. Nurs.Ed. 57B includes supervised ward teaching. Total hours, approximately 44 hours weekly including classes. (22 cred.)

Nurs.Ed. 59f,w. Principles of Psychiatric Nursing. Lectures, discussions, conferences, clinics, on all types of psychoses with etiology, management, care and treatment. Introduction to psychiatric literature. Reviews of mental hygiene. For postgraduates.

(5 cred.; 55 hrs. including 2 hrs. clinic each week. 1 clinic at Rochester State Hospital, one at St. Mary's Hospital, Rochester.)

Nurs.Ed. 60f,w,s,su. Ward Administration. The organization of the hospital; principles of administration and their application to ward management; analysis and maintenance of nursing service; selection, orientation, assignments and motivation of personnel; planning and conducting clinical teaching programs. (4 cred.; 44 hrs.)

Nurs.Ed. 61Aw,Bs. Advanced Pediatric Nursing. Lectures, conferences, seminars, demonstrations, and clinics supplemented by correlated clinical assignments. Clinical assignments include experience in infant and child observation and care, in community agency activities, and in care of the sick infant and child. 61A. A course providing for guided study of principles, technics, and problems in the care of normal children including acquaintance with community facilities and programs for better parenthood and child care. 61B. Study of the special needs and problems of the sick infant and child. (12 cred.)

Nurs.Ed. 63f. Motion Study. A course designed to apply the science of motion study to the technique of nursing. The student is taught to analyze critically the present methods used in nursing, and to devise better ways of doing the job. Motion picture method of analysis, lectures, and laboratory work. (2 cred.; 33 hrs.)

Nurs.Ed. 65w. Analysis of Nursing Care. Studies of nursing practice. Each student works on an individual problem with the view to designing an improved nursing procedure. (4 cred.; 44 hrs.)

Nurs.Ed. 66f. Introduction to Advanced Clinical Nursing. The present trends in scientific studies and public health aspects of problems related to health and disease. Study of scientific basis of investigation and its application to problems of health and illness. Practice in the selection and use of source materials. Acquaintance with community facilities and organization for the promotion of health and care of the sick. Observation in out-patient department and in community welfare and health agencies. Orientation to hospitals where clinical experience is assigned. (5 cred.)

Nurs.Ed. 66Af. Introduction to Advanced Clinical Nursing. For students enrolled in certificate curriculum in Advanced Rural Nursing. Content selected from content of Nurs.Ed. 66 to meet special need of these students. (3 cred.)

Nurs.Ed. 67f,s. Field Practice in Ward Administration. Practice in the administration of a ward, in the supervision of nursing service, and in the planning of the students' clinical experience in that division. Participation in the ward teaching program. (6 cred.; hrs. and days ar. during experience.) (Prerequisite, Nurs. 60, 65, 73, and permission of instructor.)

Nurs.Ed. 68s. Construction and Use of Examinations and Other Measurement in Basic Nursing Courses. Study of criteria for judging and improving methods of educational measurement; discussion of examinations as aids to student progress; relation of examination scores to grading systems. Practice in making and scoring course examinations. (3 cred.; 33 hrs.)

Nurs.Ed. 69f,s. Survey of Conditions and Trends in Nursing. A study of conditions existing in nursing as revealed in literature and reports. (3 cred.; 33 hrs.)

Nurs.Ed. 71f,s. The Curriculum of the School of Nursing. General principles of curriculum-making; study of the functions of the graduate nurse in the community as determinants of the clinical and classroom curricula of the professional school. Integration of materials into curricula preparing nurses as community health agents. (3 cred.; 33 hrs.)

Nurs.Ed. 72f,w,s,su. Principles of Learning and Methods of Teaching. Study of learning situations in the basic professional program in nursing. Sources, selection, and organization of instructional materials; evaluation of nursing care; content and methods of clinical teaching; measurement of outcomes. (3 cred.; 33 hrs.)

Nurs.Ed. 73w. Principles of Economics in Nursing Service Administration. A study of the principles of business administration in their application to hospital organization and management. (1 cred.; 11 hrs.)

Nurs.Ed. 74w. Sciences in a School of Nursing Curriculum. Discussion of objectives, course content, methods of instruction, choice of textbooks, integration of subject matter, and schedule planning as applied to the teaching of sciences in schools of nursing. Observation of classroom and laboratory instruction. Supervised practice as laboratory assistants. This course should preferably be carried during the last quarter of the fifth year, but may not be carried in the same quarter as Ed.T. 51B. (5 cred.; 55 hrs.)

Nurs.Ed. 75.* Fundamentals of Administration in Schools of Nursing. Concept of school of nursing and of nursing service; functions of administration in schools of nursing. (2 cred.; 22 hrs.)

Nurs.Ed. 162w. Personnel Work in Nursing. Survey of principles and techniques of personnel work applied to problems in nursing. Review of such topics as individual differences, human behavior and personality in relation to problems in personal and educational guidance. The use of such techniques as psychological tests, personnel records, orientation periods, remedial programs, and counseling interviews in the guidance of student and graduate nurse groups. (3 cred.; 33 hrs.; sr., grad.)†

* This course will be taught when the registration is sufficiently large to warrant its being given.

† A course covering some of the same topics but not carrying graduate credit is given in the summer by General Extension Division under the title Nursing Education 62.

INDEX

THE *Bulletin* OF THE...

UNIVERSITY OF MINNESOTA

Course in . . .

Applied Mortuary Science

1947-1948

CALENDAR

1947-48

Medical examination	Thursday, Friday, Saturday September 25, 26, 27, 1947
Last day for fall quarter registration	Saturday, September 27
Fall quarter classes begin	Monday, September 29
Columbus Day, a holiday	Monday, October 13
Armistice Day, a holiday	Tuesday, November 11
Thanksgiving Day, a holiday	Thursday, November 27
Fall quarter closes (Christmas recess)	Friday, December 19
Last day for winter quarter registration	Saturday, January 3, 1948
Winter quarter classes begin	Monday, January 5
Lincoln's Birthday, a holiday	Thursday, February 12
Washington's Birthday, a holiday	Monday, February 23
Winter quarter closes	Friday, March 19
Last day for spring quarter registration	Saturday, March 27
Spring quarter classes begin	Monday, March 29
Memorial Day, a holiday	Monday, May 31
Minnesota State Board examination (Final examinations)	Monday, Tuesday, Wednesday, June 14, 15, 16
Spring quarter closes	Friday, June 18

Students in the Course in Applied Mortuary Science will have a Christmas recess from December 19 to January 5.

EXAMINATIONS

On June 14, 15, 16, 1948, will be held the State Board examination for license, as well as the final examinations of the Course in Applied Mortuary Science.

NOTE: The course begins September 29, 1947, and terminates June 18, 1948.

Volume L Number 18 May 21, 1947

Entered at the post office in Minneapolis as semi-monthly second-class matter, Minneapolis, Minnesota. Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 12, 1918

The Course in Applied Mortuary Science

The University of Minnesota, through the cooperation of the Medical School and other schools of the University, the Minnesota State Department of Health, and the Minnesota Funeral Directors' Association, announces the thirty-fifth annual session of the Course in Applied Mortuary Science, September 29, 1947 to June 18, 1948. This is a nine-month course, conducted in three university quarters of twelve weeks each. The course is open to both men and women.

HISTORY

The course of instruction for the mortician was established at the University of Minnesota by act of the Board of Regents on April 4, 1908. No effective organization was made, however, and the work lapsed until it was resumed in 1914 by the Medical School. The first session began January 5, 1914, and lasted six weeks; only an eighth grade education was required for entrance. In 1916 the course was extended to eight weeks, and one year of high school work was required for admission. Since then, the length of the course has been successively extended to twelve weeks, twenty-four weeks, and in 1932 to thirty-six weeks. Graduation from high school is now required for entrance. Since 1921, the General Extension Division has had the administrative control of the course. In 1944 the name was changed from Course in Embalming to Course in Applied Mortuary Science.

PURPOSE

The work of the Course in Applied Mortuary Science combines instruction in the necessary basic sciences, training in the technical details of practical embalming, and instruction in business methods and procedures and in those subjects required by the State Department of Health as essential to the welfare of the community. The aim is to convey that knowledge which is requisite to conducting a business of this kind in the interest of the general public. All instruction is on the college level.

ADMISSION POLICY—1947-48

It should be carefully noted that an unprecedented demand and limited educational facilities will prevent unrestricted enrolment in the Course in Applied Mortuary Science for the year 1947-48. A quota has been established for this course, and acceptance will be determined by the following regulations:

1. *Applicants will be admitted at the beginning of the fall quarter only (September 29, 1947).*
2. *All applications for admission to the Course in Applied Mortuary Science should be in the Mortuary Science office by June 15, 1947.*

3. *Applications will be considered on the basis of (a) residency, (b) scholastic achievement, (c) military service, and (d) other restrictive procedures formulated by university administrative officials.*

4. *Only eligible applicants from Minnesota, North and South Dakota will be considered for admission to the session that begins September 29, 1947.*

5. *Applicants will be notified of acceptance or rejection in July, 1947.*

It should be emphasized that these policies limiting the student body in Mortuary Science are in effect for the year *1947-48 only. It is not* apparent at this time what limitations, if any, will be in force for the year 1948-49, but all interested applicants, both residents and nonresidents, seeking admission in 1948-49 should communicate with the Mortuary Science office to determine accurate information on admission policy.

VOCATIONAL ADVICE

If prospective students have any doubt as to their probable success or satisfaction as morticians it would be well for them to consult all available sources of information regarding the nature of the work, and the personal traits necessary for success in it. Some sources are: a pamphlet entitled, *Funeral Service as a Vocation,* published and sold by the National Funeral Directors Association, 111 West Washington Street, Chicago, Illinois. This publication costs 10 cents. A similar booklet, *The Jobs of Funeral Director and Embalmer,* is an occupational brief prepared and released by the United States Employment Service. The book, *We Have to Die,* by T. J. Bonniwell, contains valuable information concerning funeral service. The American Funeral Director, 330 West 42nd Street, New York 18, New York, is distributor for the Bonniwell text. Additional sources of information are the trade journals. Practicing embalmers and funeral directors should also be consulted.

ADVISERS

Advisers for the Course in Applied Mortuary Science are available for consultation in person or by letter with prospective students. Their offices may be reached by calling the University of Minnesota, Main 8177, and asking for the General Extension Division.

SPECIAL NOTICE FOR VETERANS

The Course in Applied Mortuary Science is approved by the Veterans Administration for training under Public Law No. 346 (popularly known as the G. I. Bill of Rights), and Public Law No. 16 (commonly known as Vocational Rehabilitation). Veterans who are interested in securing financial assistance from the government to pursue this course under

either law can establish their eligibility by contacting the nearest Veterans Administration office. A Certificate of Eligibility and Entitlement is needed for registration.

AWARD

The Minnesota Funeral Directors' Association will award at the graduation exercises, a certificate of merit to the outstanding student in Applied Mortuary Science. The student will be selected by a committee from the association, on the basis of scholarship, citizenship, professional attitude, and personality.

HEADQUARTERS OF THE COURSE

The office of the General Extension Division is also the office for the Course in Applied Mortuary Science. The Extension Offices will, on or about June 15, 1947, be located on the first and second floors of the east wing of Nicholson Hall (old Union Building). To secure information on the Course in Applied Mortuary Science, call Main 8177 and ask for the General Extension Division.

Nicholson Hall is north and west of Northrop Memorial Auditorium. Access to the Mortuary Science office is gained from a ground floor entrance directly behind Northrop Auditorium.

GENERAL INFORMATION

ADMISSION

As the Minnesota State Department of Health admits to its examination for license only persons who are at least twenty years of age at date of examination (June 19, 1948), applicants desiring a Minnesota license should be at least nineteen years of age when entering the Course in Applied Mortuary Science. Most states will not issue a license to a candidate who is less than twenty-one years of age.

Ordinarily high school graduation is the basic prerequisite for admission to the Course in Applied Mortuary Science. This means that applicants from states where college attendance is not mandatory for licensure should be graduates of a four-year high school or a three-year high school preceded by junior high school. An equivalent education properly certified may be accepted by the director. (See Admission Policy—1947-48, page 3.)

Special notice for Minnesota students—Students who desire to become eligible for the embalmer's license in the state of Minnesota (see pages 8-10) must have completed a year (45 quarter credits, or 30 semester credits, or their equivalent) of general study in an accredited college or university before entering the Course in Applied Mortuary Science. The General Extension Division will determine for applicants whether their work has been in an acceptable accredited institution. Those who do not

conform to this rule will not be considered candidates for a license to practice in Minnesota. At the present time the subject matter to be covered in this study is not prescribed. It is recommended, however, that it include a full year of English composition, together with some work in general biology (botany, zoology, or human physiology), and in the social sciences (economics, political science, or sociology). Introductory work in such Course in Applied Mortuary Science subjects as accounting, art, and chemistry will also be useful.

N.B.—This year of college study must not be considered as prerequisite to admission to the Course in Applied Mortuary Science. Most states indicate high school graduation as the minimal educational requirement for the embalmer's license, but some states have modified their regulations to include one or more years of college.

It is highly important that prospective students ascertain the precise requirements of their own state, or the state in which they hope to secure a license, before entering this or any other school or course of mortuary science.

Application blanks—Applicants for admission will be supplied with a standard blank which asks for certain information. If the applicant has studied at a collegiate institution beyond high school, he should support his completed application blank with a certified transcript or statement from the registrar or recorder. This statement should show the applicant's complete record, including an honorable dismissal.

Eligible high school graduates must complete the application blank which includes a certified statement from the principal, or other proper official, covering the applicant's high school record and an estimate of his probable success.

Applications for admission should be sent to the Course in Applied Mortuary Science, General Extension Division for consideration. Satisfactory applications will be considered as indicated under Admission Policy, page 3.

MISCELLANEOUS

Medical examination—At some time during the three days, September 25, 26, 27, all new students will present themselves at the Health Service for the required medical examination.

University Library—The University of Minnesota General Library, one of the most complete in the country, with a special division in the biological and medical sciences, is available for use by students in this course.

Athletic recreation—The university facilities for physical education, recreational sports, and intramural activities are open to students of the Course in Applied Mortuary Science. A booklet, giving detailed information regarding physical education and athletics for men and women, is issued to all students at the time of the medical examination, Septem-

ber 25, 26, 27. Additional information may be obtained at the Intramural Athletics office, 203 Cooke Hall.

Athletic tickets—Students in the Course in Applied Mortuary Science are eligible to obtain the regular university athletic season tickets at the customary reduced rates. Directions for obtaining these tickets and schedules of games may be found in the Official Daily Bulletin of the *Minnesota Daily*.

New Students Week—Students in the Course in Applied Mortuary Science are invited to take part in the exercises provided for all new entering students. The week of September 22-26 is occupied with a variety of events that have been found profitable to new students.

REGISTRATION

Persons whose applications have been accepted, and only those who can produce the letter of acceptance, will register at Room 155 or 153, Nicholson Hall, on the campus of the University of Minnesota. The registration must be completed by payment of fees on or before Saturday, September 27, 1948, by twelve o'clock noon. Late registrations accepted are subject to an extra fee (see Fees and Expenses, below).

Veterans registering under Public Law 346 (G.I. Bill) or Public Law 16 (Rehabilitation) should present a Certificate of Eligibility and Entitlement or authorization from Veterans Administration. These documents will provide for tuition, incidental fee, books, supplies and equipment.

FEES AND EXPENSES

Tuition—The tuition fee for residents of the state of Minnesota is $50 for each of the three quarters; or $150 for the school year, for residents of other states, $90 per quarter or $270 for the school year. For less than a full program of work: residents $4.25 per credit hour equivalent, nonresidents $7.50 per credit hour equivalent. Fees are payable by the quarter, at registration. All checks should be made payable to the University of Minnesota, and should be drawn *for not more than the amount due*.

Incidental fee—All students of the University are charged an incidental fee of $10.65 per quarter, payable at registration, covering the following services: the privileges of the Coffman Memorial Union, the Counseling Bureau, the *Minnesota Daily* including the Official Daily Bulletin, the university post-office service, *University Address Book*, the University Health Service which includes a complete medical examination, and other items.

General deposits—At the student's first registration a deposit fee of $5 is required. From this are deducted from time to time such charges as may arise for locker rental, laboratory breakages, library fines, damage to university property, or any other similar matters. If the deposit becomes exhausted at any time another deposit of $5 must be paid. The

unused balance of the deposit will be returned at the close of the course, or upon withdrawal of the student at any earlier time. This fee is not covered by the provisions of the G.I. Bill of Rights.

Privilege fees—Registration, for each quarter, must be completed and fees paid before noon of the Saturday preceding the first meeting of the classes. The fee for the privilege of late registration, or late payment of fees, is $2 through the third day of classes; on the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5.

Chemical laboratory—Each student at the beginning of the course will purchase at the bursar's office a $5 card; against this will be charged the laboratory fee of $2, and materials and breakage for the quarter. Subsequent cards will be required in succeeding quarters, but unused portions may be returned for refund.

Books—The student should be prepared to purchase textbooks to the amount of at least $25. (Veterans' books are provided under Public Laws 346 and 16.)

Living expenses—There is a critical shortage of adequate housing. It will be difficult to secure good rooms for lodging near the campus. Living expenses are probably inflated at least 20 per cent. Students are urged to secure accommodations before they attend the University. The University maintains a Student Housing Bureau at 230 Northrop Memorial Auditorium.

EXAMINATIONS FOR UNIVERSITY CERTIFICATE

At the end of the last quarter of any class running more than one quarter, examinations are given which cover the work of all preceding quarters in this class. The degree of success attained by any student in these examinations determines his final grades. At the close of the spring quarter the University Certificate in Applied Mortuary Science is issued to those students who have successfully completed all the work of the course. This is the University's recognition of satisfactory work; it should be understood that the certificate is issued entirely without reference to the legal requirements for the issuance of the Minnesota state embalmer's license. The requirements for that license and the qualifications for applicants are given below.

EXAMINATION FOR MINNESOTA STATE LICENSE

Candidates for a Minnesota embalmer's license must pass satisfactorily the examination given by the Minnesota Department of Health. The examination is conducted annually and is open to all applicants who have complied with the requirements of the law and the regulations of the Minnesota Department of Health; it is given at the close of the school year. The Department of Health is responsible for its examination and collects a fee of $10 from each applicant. After complying with the necessary requirements given below and passing this examination,

the applicant will receive the state license. Students in this course should discriminate carefully between the state requirements for a license and the requirements of the University for a certificate.

Necessary qualifications—The Minnesota Department of Health requirements for embalmer's license are as follows:

Embalmers—Examination and License

29. Every funeral director or embalmer who wishes to qualify as competent to prepare a body for burial or transportation, as required by the laws of the State of Minnesota (Sections 149.01-149.06, inclusive, Minnesota Statutes 1945), shall comply with the following requirements:

He shall make application to the Minnesota State Board of Health for a license. Such application shall contain the name of the applicant in full, age, and place of residence. It shall be endorsed by a licensed embalmer and two registered physicians of good repute as to the applicant's general standing.

Necessary Qualifications (Embalmer's License)

The applicant must be at least twenty-one years of age; must have satisfactorily completed at least one scholastic year in a general educational course at an accredited college or university, and in addition thereto must have completed a course of study and secured a certificate of graduation from the Course in Applied Mortuary Science conducted by the University of Minnesota or any established school of embalming recognized and graded "AA" or "A" by the Conference of Funeral Service Examining Boards of the United States, Incorporated. Provided, that any person who has attended a one-year course in embalming conducted by the University of Minnesota, but who has failed in the examinations for the university certificate in not more than two of the subjects, shall be permitted to take the board's examination for license and the subjects he passes in such examination shall be recorded and upon obtaining the university certificate he shall be required to pass the board's examination only in the subjects in which he may have failed.

Provided, further, that following the educational work outlined herein, said applicant has had at least one year of practical experience (apprenticeship) under a licensed embalmer, during which he has embalmed or helped to embalm at least twenty-five bodies, and on condition applicant has been registered with the State Board of Health during the full period of his practical experience, or apprenticeship. Applicant must attain a proficiency of at least seventy-five (75) per cent in each of the following subjects, in which he shall be examined by the State Board of Health:

Anatomy	10 questions
Bacteriology	10 questions
Elementary Chemistry	10 questions
Public Health, Sanitation, and Laws and Regulations	20 questions
The Practice of Embalming	20 questions
Business Methods	5 questions

NOTE: The year of college work to be taken in advance of the Course in Applied Mortuary Science.

N.B.—A student, having successfully passed this examination of the State Board, will be eligible for license provided he has completed one year of registered apprenticeship experience following graduation from an accredited embalming school and is 21 years of age, subject to the following conditions:

1. If the applicant attains the required age and experience within one year after passing the examinations and does then promptly apply for license, it will be issued without additional examination.
2. If required age and experience is not obtained within one year after passing such examinations it will be necessary for the applicant to be re-examined in "Practical Embalming" only. Such examination will be given him by a member of the Board's Committee of Examiners.

3. If applicant does not apply for license within one year after the date from which he has finally removed all deficiencies as to age or experience, license will be granted only after a complete re-examination at one of the regular examinations of the Board.

For further information concerning the state embalmer's license apply to the State Department of Health, State Office Building, St. Paul 1.

COURSE OF STUDY

The following subjects constitute the work in Course in Applied Mortuary Science. These subjects, as indicated, are divided among the three quarters, and the hours designated are approximate. A class schedule will be issued at the beginning of each quarter.

ACCOUNTING AND BUSINESS METHODS

Reuel I. Lund, Ph.D., C.P.A., Instructor in Accounting

Five credits (60 hours, winter, spring). This course will include financial records, periodic adjustments and closing entries, accounting statements, and control accounts for business in general. Suitable records and statements for a funeral establishment. A set of transactions for a funeral business has been devised, which the student carries through typical records and statements. Methods of obtaining cost data for a variety of priced cases are demonstrated.

ANATOMY

Instructor to be announced.

Anat. 1. Nine credits (200 hours, fall, winter, spring). Lectures, recitations and laboratory work. This includes both microscopic anatomy and gross dissection, and covers the principal systems of the body. Each student will obtain experience in personally raising different arteries, and will familiarize himself with the anatomy relating to practical embalming.

ART

Instructor to be announced.

Three extension credits (36 hours, fall, winter, spring). Lectures and practical demonstrations in sculpture, color, light and shade, and design. Subjects of study:

Sculpture—(1) The art of modeling and cosmetics as applied to the rebuilding of the human face and body. (2) The structure of the skull. (3) Muscular structure. (4) Differences in the muscular coverings. (5) Forms to be found in the eyes, mouth, nose, and other portions of the face, head, and body. (6) Methods and materials used in the making of death masks.

Color—(1) Analyses of color. (2) How color reveals or destroys form. (3) Color to give the effect of beauty. (4) Effect of environment on the appearance of color. (5) Subtractive and additive methods of mixing colors.

Light and shade—(1) Light and shade in vision and the arts. (2) Light and its effect on form. (3) Exterior lighting. (4) Reflective light and its uses. (5) Light to express moods. (6) Light to present beauty and character.

Design—Its application to floral arrangements, caskets, and interiors.

BACTERIOLOGY

Robert G. Green, M.D., Professor, and Richard M. Marwin, Instructor

Bacteriology I. Four credits (72 hours, spring). Lectures, recitations, demonstrations, and practical work for each student. Subjects of study:

1. Classification of bacteria. Morphological types.
2. Saprophytic bacteria in their relation to the natural processes of putrefaction, liquefaction, and oxidation of animal and vegetable tissues.
3. Parasitic or disease-producing bacteria.
4. Methods of differentiating bacteria.
5. Methods of cultivating bacteria.
6. Methods of estimating the number of bacteria in measured quantities of material.
7. Studies of disinfection and disinfectants.
8. Pathogenic fungi and protozoa.
9. Viruses.

BUSINESS ENGLISH

C. M. Fredin, B.S.L.

Two extension credits (24 hours, winter). Lectures on the fundamentals of grammar, punctuation, and spelling. Instruction and practice in writing business letters.

CHEMISTRY

Norville C. Pervier, Ph.D., Associate Professor of Chemistry

Nine extension credits (150 hours, fall, winter, spring). Lectures, demonstrations, and individual laboratory work covering fundamental ideas of inorganic and organic chemistry. The chemistry of the body and of disinfection and sanitation and certain general chemical actions involved in the work of morticians will be presented. Subjects of study:

1. General principles: (a) the science of chemistry, (b) the structure of matter, (c) the behavior of matter, (d) chemical action, (e) types of chemical change.
2. Iorganic chemistry: (a) typical nonmetallic elements, (b) solutions, (c) acids, bases, and salts, (d) ionization, (e) typical metallic elements, (f) naming of chemical compounds.
3. Organic chemistry: (a) classification, (b) structure, (c) reaction, (d) naming.
4. Physiological chemistry: (a) enzymes and enzyme action, (b) compounds usual in organized life, (c) respiratory processes, (d) digestive processes, (e) chemical actions in the tissues, (f) colloids.
5. Toxicology: (a) classification of poisons, (b) action in the body, (c) diagnosis of poisoning, (d) tests, (e) antidotes, (f) Minnesota law.
6. Chemical changes in cadavers: (a) signs of death, (b) rigor, (c) autolysis, (d) putrefaction, (e) adipocere, (f) tissue gas, (g) lividities.
7. Disinfection: (a) standardization, (b) chemicals and concentrations used, (c) methods, (d) calculations.
8. Embalming fluids: (a) ingredients, (b) chemical actions in the body (c) testing, (d) compounding, (e) analysis, (f) calculations.

FUNERAL LAW

Instructor to be announced.

Three extension credits (36 hours, fall). Lectures on basic funeral law and mortuary jurisprudence.

FUNERAL MANAGEMENT

Twin City funeral directors and university instructors

Two extension credits (24 hours, winter). These lectures are intended to acquaint the student with the best current practice in funeral management. They offer an opportunity to meet local morticians of long experience and high standing, and to acquire practical, dependable information about the important aspects of operating a funeral establishment—an opportunity the value of which students will readily appreciate. The lectures will deal with such subjects as the following:

History of embalming
Merchandising
Ethics of funeral directing
Conduct of Catholic, Episcopal, Jewish, fraternal organizations, and military funerals
Funeral arrangements
Cosmetics and hairdressing
Floral arrangements
Lighting and music
Metal caskets and vaults
Wooden materials used in mortuary practice
Showrooms and salesmanship
Costs and overhead expenses
Advertising
Selling
Credits and collections
The funeral director's place in the community
The state association of funeral directors

PATHOLOGY

Elexious T. Bell, M.D., Professor of Pathology, and assistants

Nine credits (96 hours, fall, winter, spring). Lectures on gross pathology, with demonstration. Attendance at autopsies when arrangements can be made.

PERSONAL HEALTH

William A. O'Brien, M.D., Professor of Preventive Medicine and Public Health

P.M. and P.H. 3. Two credits (24 hours, fall). Right living habits as related to physical and mental health. Attention to the chief causes of disability and death from the point of view of personal hygiene.

PRACTICAL EMBALMING AND FUNERAL DIRECTION

F. Lloyd Hansen, M.A., Assistant Professor, and T. F. Saholt, Licensed Embalmer

Nine extension credits (170 hours, fall, winter, spring). Lectures, demonstrations, and other visual presentations, laboratory practice, and clinical work. Class participation in actual embalming will be emphasized. Subjects of study will include the following:

1. Scope of profession
2. Modes of death
3. Signs of death
   a. Livoris mortis
   b. Algor mortis
   c. Rigor mortis
   d. Decomposition and putrefaction
4. Discoloration
   a. Cause
   b. Prevention
   c. Removal

5. Embalming
   a. Pre-embalming technique
   b. Arterial
   c. Penetration
   d. Hypodermic
   e. Cavity
6. The arterial and venous systems
   a. Superficial venous blood return
   b. Deep venous blood return
   c. Arteries employed in embalming
7. Violent deaths
   a. Poisons
   b. Gunshot wounds
   c. Mutilated cases
8. First call
9. Pressure injection
10. Analysis of cases
    a. Tissue gas and gas gangrene
    b. Edema
    c. Jaundice
    d. Frozen bodies
    e. Burns
    f. Communicable diseases
    g. Preparation for transportation
    h. Autopsies
11. Embalming hygiene
12. Funeral directing and management
    a. Pricing
    b. Salesroom arrangement and selling
    c. Advertising

EMBALMING CLINICS

Throughout the year all students will be subject to call to attend cases made available through the courtesy of Twin City funeral directors, the local morgues, or other agencies. These clinics are under the direction of Mr. Saholt. Every possible opportunity will be given students to assist in preparations.

PSYCHOLOGY

Wendell White, Ph.D., Associate Professor of Psychology

Two extension credits (24 hours, fall). This course will present those principles of psychology most helpful to the prospective funeral director in dealing tactfully with the people with whom he comes in contact—especially those under severe emotional stress.

PUBLIC HEALTH

The Minnesota Department of Health staff will give a series of lectures arranged by the executive officer, A. J. Chesley, M.D., and the following:

R. N. Barr, M.D., M.P.H., Chief, Section of Departmental Administration

J. W. Brower, LL.B., Director, Division of Administration

Dean S. Fleming, M.D., M.P.H., Chief, Section of Preventable Diseases

Herbert M. Bosch, M.P.H., Chief, Section of Environmental Sanitation

Paul Kabler, Ph.D., M.D., M.P.H., Chief, Section of Medical Laboratories

Viktor O. Wilson, M.D., M.P.H., Chief, Section of Special Services

Three extension credits (36 hours, spring). The purpose of this series of lectures is to set forth the basic principles of public health, the official federal, state, and local public health organizations for the protection of

the public health and the powers and duties of such organizations, and the relations of embalmers and funeral directors to such activities. It offers the future embalmer and funeral director valuable orientation in his responsibilities for the health of his community and in his relationships with the local health boards and the State Department of Health. Presentation will be through lectures and motion pictures. Subjects of study will include:

1. Public health laws and regulations
2. Preventable diseases
3. Public sanitation
4. Venereal diseases
5. Vital statistics
6. Child hygiene

Correspondence should be addressed to:

The Director
Course in Applied Mortuary Science
General Extension Division
University of Minnesota, Minneapolis 14

The Bulletin of the
UNIVERSITY *of* MINNESOTA

The Graduate School
Announcement of Graduate Work in the Medical School and the Mayo Foundation, and in the Schools of Dentistry and Pharmacy, 1947-1949

Volume L, Number 21 June 23, 1947

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UNIVERSITY CALENDAR

1947			*Fall Quarter*
August 1–October 4			Registration of graduate students
September	29	Monday	Fall quarter classes begin, 8:00 a.m.[1]
October	9	Thursday	Language examinations
November	6	Thursday	Last day for filing Ph.D. theses for the fall quarter
November	20	Thursday	Last day for filing Master's theses for the fall quarter
December	18	Thursday	Commencement Convocation
			Fall quarter ends, 6:00 p.m.
1948			*Winter Quarter*
January 2–January 10			Registration for graduate students
January	5	Monday	Winter quarter classes begin, 8:00 a.m.[1]
January	15	Thursday	Language examinations
February	5	Thursday	Last day for filing Ph.D. theses for the winter quarter
February	19	Thursday	Last day for filing Master's theses for the winter quarter
March	18	Thursday	Commencement Convocation
			Winter quarter ends, 6:00 p.m.
			Spring Quarter
March 26–April 3			Registration for graduate students
March	29	Monday	Spring quarter classes begin, 8:00 a.m.[1]
April	8	Thursday	Language examinations
May	1	Saturday	Last day for filing Ph.D. theses for the spring quarter
May	8	Saturday	Last day for filing Master's theses for the spring quarter
June	11	Friday	Spring quarter ends, 6:00 p.m.
June	12	Saturday	Seventy-sixth annual commencement
			Summer Session
June	15	Tuesday	Registration for first term
June	16	Wednesday	First term Summer Session classes begin, 8:00[1] a.m.
June	24	Thursday	Language examinations
June	24	Thursday	Last day for filing theses for first term of Summer Session
July	23	Friday	First term closes
July	26	Monday	Registration for second term
July	27	Tuesday	Second term classes begin, 8:00[1] a.m.
July	31	Saturday	Last day for filing theses for second term of Summer Session
August	26	Thursday	Summer commencement 8:00 p.m.
August	28	Saturday	Second term closes

[1] First hour classes begin at 7:45 at University Farm.

GRADUATE WORK IN MEDICINE

ORGANIZATION

The graduate work in dentistry, medicine, pharmaceutical chemistry, and public health in the Medical School and the Mayo Foundation is a part of the work of the Graduate School of the University. Its management is entrusted by the Board of Regents to a committee composed as follows:

The President of the University, James L. Morrill, B.A., LL.D.

The Dean of the Graduate School, Theodore C. Blegen, Ph.D., L.H.D., Litt.D.

The Dean of the Medical Sciences, Harold S. Diehl, M.A., M.D., D.Sc.

The Director of the Mayo Foundation, Donald C. Balfour, M.D., LL.D.

Acting Director of the Mayo Foundation, Victor Johnson, Ph.D., M.D.

Elexious T. Bell, M.D., of the Medical School

Leo G. Rigler, M.D., of the Medical School

Maurice B. Visscher, M.D., Ph.D., of the Medical School

Cecil J. Watson, M.D., Ph.D., of the Medical School

Arlie R. Barnes, M.A., M.D., M.S. in Med., of the Mayo Foundation

Ralph K. Ghormley, M.D., of the Mayo Foundation

James W. Kernohan, M.D., D.P.H., M.A., of the Mayo Foundation

Frank C. Mann, M.D., M.A., D.Sc., of the Mayo Foundation

James T. Priestley, M.D., M.S. in Experimental Surgery, Ph.D. in Surgery, of the Mayo Foundation

Russell M. Wilder, M.D., Ph.D., of the Mayo Foundation

GENERAL INFORMATION

The graduate work in medicine here outlined is not intended for those seeking brief practitioners' review, or demonstration courses. Opportunities of this kind are to be found in the *Bulletin of the Center for Continuation Study,* and in special announcements from the Mayo Foundation.

Purpose—The object of this graduate work in medicine is the training of fully equipped and properly certified specialists for medical practice, and of investigators and teachers in the various branches of medicine.

Standards—For graduate work in medicine the University of Minnesota, in order to secure results and safeguard scientific standards, adopted those general policies and methods already indicated by the established graduate work in other sciences. The development of such work has depended upon the maintenance of real standards of admission; the supply of qualified advisers to graduate students; the provision of adequate laboratory, clinical, and library equipment; and the institution of rigid tests in courses and examinations in residence, with evidence of the power of productive research on the part of the graduate student as demonstrated in a thesis.

In clinical branches the degree of master of science is intended primarily to indicate scientific proficiency. To be recommended for this degree the candidate must have given evidence that he is competent to begin the practice of a clinical specialty in a scientific manner without the supervision of others. The doctorate of philosophy in clinical subjects will be given only to those men who have not only given evidence of proficiency at least equal to that required for the Master's degree, but who in addition present evidence of well-marked ability to advance medical science through original investigation.

Laboratory equipment—The laboratory equipment for the prosecution of graduate work in medicine is located in Minneapolis, St. Paul, and Rochester. The laboratory branches are well housed in excellently equipped buildings on the campus at Minneapolis and at Rochester. The university museums of anatomy, pathology, and surgery contain a large number of specimens available for teaching purposes.

The Mayo Foundation Museum of Hygiene and Medicine exhibits, depicting the latest surgical techniques, as well as the more recent methods of diagnosis and treatment are available for study. The exhibits represent an accumulation of the more important exhibits that have been prepared in collaboration with the museum staff and members of the staff of the Mayo Foundation and the Mayo Clinic. Facilities for extensive research are also available in the laboratories in St. Mary's Hospital, at the Aeromedical Unit and at the Institute of Experimental Medicine.

Clinical equipment—The University owns and controls Elliot Memorial Hospital with its service building, the Memorial Cancer Institute, the Todd Memorial Hospital, the William Henry Eustis Hospital for Crippled Children, and the Students' Health Service.

The State Hospital for the Crippled and Deformed, located at Phalen Park, St. Paul, offers the University full participation in its clinical opportunities. The Minneapolis Veterans Hospital, the city hospitals of Minneapolis and the Ancker Hospital of St. Paul as well as certain private hospitals in Minneapolis and St. Paul are available for graduate work.

In Rochester, Colonial, Curie, Kahler, St. Mary's, and Worrall hospitals and the Rochester Hospital for the Insane are available. All patients are examined clinically in the Mayo Clinic Building.

Services are so arranged that a fellow may find time in addition to his clinical responsibilities to carry forward consistently some research problem. The Institute of Ex-

perimental Medicine provides adequate facilities for experimental pathology, physiology, and surgery. Seminars and conferences in the several special groups, such as the group seminars, clinical-pathological conferences, Research Club, and others, are conducted to afford opportunities for fellows to present interesting clinical and research material, correlating knowledge of the various phases of the subject. While the presentations may be clinical, the relationship of the fundamental fields to the clinical problem is always emphasized.

The working museum of more than 1,000,000 pathological specimens, cataloged and cross-indexed for study and research, is housed in the Medical Sciences Building.

Arrangements have been made whereby fellows or other graduate students in medicine may divide their time, part of their work being taken in the Mayo Foundation at Rochester and part in the Medical School at Minneapolis and St. Paul.

Libraries—Besides the University Library and the departmental libraries, there are at the disposal of the student the general medical and biological libraries in the University Library, and the collections of the Hennepin County and Ramsey County Medical Societies. The medical library of the Mayo Foundation occupies one floor of the clinic building with ample provision for a general reading room and private rooms for special studies. Current issues and complete files of the most important medical periodicals are available in both Minneapolis and Rochester.

Methods of study—Graduate work in medicine is maintained on a university basis. The graduate student is encouraged to study independently rather than to receive formal instruction by undergraduate methods. The student's work is graded quarterly by his immediate chief. Work which receives a grade below B will not be counted for graduate credit in the major field, nor if below C, in the minor. Students with unsatisfactory records will not be permitted to continue.

Admission—All graduate students are admitted by the dean of the Graduate School. Entrance upon work for the advanced degrees of master of science (M.S.) or doctor of philosophy (Ph.D.) in the clinical departments of medicine is limited to those who have: (a) the Bachelor's degree in arts or science or its equivalent; (b) the degree of doctor of medicine from an acceptable institution (i.e., one approved by the American Medical Association); and (c) one year's experience as an intern in an approved hospital or as an assistant in a laboratory of an acceptable medical school. In the fundamental laboratory sciences (anatomy, bacteriology, biochemistry, biophysics, pathology, pharmacology, and physiology) properly prepared students may be admitted without (b) and (c) as candidates for the Master's degree (M.A. or M.S.) or the Doctor's degree (Ph.D.). In the field of cancer biology students having a broad background in the basic sciences may be admitted without (b) and (c) as candidates for the Master's degree (M.A. or M.S.) or the Doctor's degree (Ph.D.).

In the selection of graduate medical students, and in making appointments to fellowships for medical graduate work, preferance will be given, other things being equal, to candidates who have more extensive training in the fundamental medical sciences (i.e., anatomy, pathology, physiology, etc.) through which they approach the specialty which they wish to take as a major subject. Personal interviews with applicants are desirable.

Registration and number of students—All graduate students entering upon graduate work in medicine will register with the dean of the Graduate School. Fellows who begin their residence in Rochester may fulfill the preliminary requirements by registering there with the director of the Mayo Foundation. The number of graduate students who will be registered for work is determined by the clinical opportunities and laboratory facilities available.

Tuition—The tuition fee at the Medical School for the graduate work in clinical medicine for those not holders of fellowships or otherwise entitled to exemption is $77 per quarter for residents of Minnesota and $150 per quarter for nonresidents. For

students in the fundamental laboratory branches, the tuition fee is $35 per quarter for residents of Minnesota and $75 per quarter for nonresidents. The tuition fee for graduate work in Dentistry is $75 per quarter for residents, $120 per quarter for nonresidents, and in Pharmacy $40 per quarter for residents, $85 per quarter for nonresidents. Extra fees may be charged to cover the cost of materials and supplies for exceptional laboratory experimentation. The special fees for graduate work in the Summer Session are stated in the separate *Summer Session Bulletin*. Fellows, scholars, and members of the teaching or scientific staff giving 25 per cent or more full-time service are exempt from tuition.

Fellowships and assistantships—Medical fellowships in the clinical departments of the Medical School are now established as follows: in anesthesiology, 7; in internal medicine, 12; in dermatology, 2; in psychiatry, 4; in neurology, 4; in obstetrics, 6; in ophthalmology, 4 and in otolaryngology, 4; in pediatrics, 4; in radiology, 5; in physical medicine, 2; and in surgery, 10; in neurosurgery, 3; in orthopedic surgery, 3; and in urologic surgery 3. In addition, there are several clinical fellowships in the Minneapolis General Hospital. They include 6 in medicine, 2 in ophthalmology and otolaryngology, 2 in pediatrics, and 6 in surgery. They carry a stipend of $1,380 for each of the three successive years. These medical fellows are required to devote their entire time (excepting an annual vacation of four weeks) to graduate work, including a small amount of teaching.

Similar medical fellowships or teaching assistantships have been established in the fundamental laboratory departments of the Medical School as follows: in anatomy (including embryology and histology), 9; in bacteriology, 10; in pharmacology, 4; in physiology, 6; in physiological chemistry, 6; and in public health, 8. These fellowships and assistantships carry a stipend of $900 per year on a half-time nine-month basis. There are 6 fellowships in pathology which carry a stipend of $1,380 for each of three years. They require a small amount of teaching, the remainder of the time being devoted to graduate work leading to advanced degrees.

In addition, there are at Minneapolis 5 fellowships without stipend, carrying free tuition with opportunity for graduate study in any of the clinical departments.

The attention of prospective medical graduate students is also called to the Shevlin Fellowship in Medicine yielding $500 and tuition. This fellowship permits work in any department of medicine, preference being given to the laboratory sciences. Applications should be in the hands of the dean of the Graduate School before February 1.

The Mayo Foundation carries the following basic and clinical fellowships: in anesthesiology, 14; in bacteriology, 3; in biophysics, 2; in chemistry, 2; in dermatology, 15; in internal medicine, 100; in neurologic surgery, 6; in neurology and psychiatry, 10; in nutrition, 2; in obstetrics and gynecology, 10; in ophthalmology, 8; in orthopedic surgery, 20; in parasitology, 2; in pathology, 20; in pediatrics, 11; in physical medicine, 5; in physiology, 2; in plastic surgery, 5; in proctology, 7; in radiology, 18; in rhinology and otolaryngology, 8; in surgery, 125; and in urology, 12. The fellowships carry stipends of $1,110 each year on a twelve-month basis with an annual vacation of two weeks.

Nominations for fellowships on the Mayo Foundation are made each quarter, beginning with October 1, for residence to begin six months later or as vacancies occur. Each applicant is notified of his nomination immediately after it is made and his acceptance or rejection thereof requested. In the Medical School appointments are made as vacancies occur.

Applicants for fellowships are expected to read and speak English fluently. Fellows must pass a satisfactory physical examination including X ray of chest after nomination and before being finally accepted.

All appointments are made for one year and are renewable annually for a total period of three years upon the basis of satisfactory progress in the work pursued. Requests for blanks for application for fellowships and assistantships should be addressed to the Dean

of the Graduate School, University of Minnesota, Minneapolis 14, Minnesota, or for fellowships on the Mayo Foundation to the Director of the Mayo Foundation, Rochester, Minnesota.

Special assignments—Special students, such as fellows from other universities or foundations, officers of the medical corps of the United States Army, Navy, or Public Health Service, and others, may be accepted at Rochester in laboratory and clinical branches for shorter periods. The number is necessarily limited, in order not to interfere with the work of the resident fellows. Correspondence concerning this should be addressed to the Director of the Mayo Foundation, Rochester, Minnesota.

Fellows who have satisfactorily completed three years of residence in the Mayo Foundation may be awarded assistantships in the Mayo Clinic.

Several of the departments in the Medical School (including Anatomy, Bacteriology, Biostatistics, Pathology, Pharmacology, Physiological Chemistry, Physiology, and Public Health) have other paid assistantships which may furnish means of self-support while the holder is pursuing graduate work. For further information, address the Dean of Medical Sciences, University of Minnesota, Minneapolis 14, Minnesota.

Clinical and class work for visiting or resident practitioners—In order that there may be no misunderstanding it should be stated that the graduate work for a limited number, described above, in no way alters the arrangements offered in Minneapolis by the Medical School for practitioners who wish to attend such undergraduate medical classes as may be of profit to them without interfering with the regular work of the staff and students of the Medical School. Class visitors are charged the same fees as students regularly registered for credit. Inquiries concerning these opportunities should be addressed to the Dean of Medical Sciences, University of Minnesota, Minneapolis 14, Minnesota.

Nor do the fellowships in the Mayo Foundation change or modify the opportunities for observation extended visiting physicians and surgeons by the Mayo Clinic in Rochester. Inquiries concerning these should be addressed to the Director of the Mayo Foundation, Rochester, Minnesota.

REQUIREMENTS FOR ADVANCED DEGREES IN MEDICINE

1. **Licensure**—Graduate students working in any field of clinical medicine must be licensed to practice in Minnesota within six months after beginning their work in either the Medical School or the Mayo Foundation.

2. **Residence**—Upon entrance to the Graduate School, the candidate, with the approval of the dean, will select his adviser in the field of his major work. With the approval of his adviser and the dean, he will outline a study program for the year and if possible for the period of residence.

For the Master's degree (M.S.) in clinical subjects, two or three years are required. For the Master's degree without special designation in the laboratory sciences a minimum of one year (three quarters) of residence is required. For the Master's degree *with field named* (M.S. in Path. or Rad.) in pathology or radiology, three years are required. The longer term of three years is required in all cases where the Master's degree is granted in clinical subjects *with field named.* This implies clinical proficiency in the special field. For the ordinary Master's degree *without special designation,* the length of residence in clinical fields may be reduced to two years. This rule should be noted also when the M.S. is taken in connection with the preliminary examination for the Ph.D. in clinical subjects. For the Doctor's degree (Ph.D.) at least three full years of successful graduate study are required, including certain special requirements noted below.

3. **Language requirements**—A reading knowledge of French and German in the field of the candidate's major must be certified by the professors in charge of these

languages at least one year before the Doctor's degree is conferred, and before admission to the preliminary examination. By petition a student may substitute another foreign language for either French or German. For the Master's degree in the laboratory sciences, a reading knowledge of only one foreign language is required, which must be certified before the end of the second quarter of the year in which the candidate expects to present himself for the degree. For the Master's degree (M.S.) in the clinical branches, the language certificate is optional. A repetition of this examination because of failure is considered a special examination for which a regular fee of $5 is charged.

4. **Study program**—The study program for the entire three years should be submitted at the beginning of the first year and must be submitted before beginning the second year. A blank for filing this three-year program may be obtained in the Graduate School office. This program requires approval by the student's adviser, by his minor department, by the Medical Group Committee, and by the dean. Sufficient research work to train the fellow properly in the principles and methods of scientific investigation and to form the basis of an acceptable thesis is required.

5. **Minor**—With the approval of his adviser and the dean of the Graduate School, each student upon entrance selects a minor, which must be logically related to his major subject, and (for the Doctor's degree) must be completed by the end of the second year. The minor is preferably a laboratory subject in some other department, and should amount to not less than one sixth of the total work for the degree. *At least one sixth* of the work offered for the degree in a clinical subject should consist of graduate courses in those fundamental laboratory branches which will serve as a basis for the proposed clinical specialization. This fundamental work should be concentrated in the first part of the course so far as possible. The final examination in the minor for the Doctor's degree is included in the preliminary examination, as noted below. For the Master's degree no special examination is required in the minor, aside from the usual course examinations.

Familiarity with those phases of the medical sciences essential to proficiency in the major specialty will be required.

6. **Major**—The major is that field in which the student desires to specialize. Together with the thesis, the major work should occupy *at least two thirds* of the total work for the degree.

7. **Certificate of proficiency**—Each candidate must have a certificate of proficiency signed by all members of the faculty with whom he has served, stating that in their opinion he is competent to begin the practice of his major field in a scientific manner without the supervision of others.

8. **Admission to candidacy**—For the Master's degree without major designation, students who have met the language requirement, whose daily work in residence as indicated by quarterly grades has been satisfactory, and whose thesis subject has been properly approved, are admitted to candidacy at the end of the second quarter. For the Doctor's degree, the student is required to pass a preliminary examination, as noted below, before admission to candidacy.

9. **Preliminary examination**—At least seven months before the Doctor's degree is conferred, an oral preliminary examination (not to exceed three hours) is given by a committee of at least 6 members appointed by the dean. Certificates of proficiency in French and German, completion of the minor work, and the recommendation of the major department shall be required before admission to this examination. The examination is in addition to the usual course examinations. It shall cover the graduate work previously taken by the student, *and may include any work fundamental thereto. The field of the candidate's specialization and the thesis are reserved for the final examination.* Only after the successful completion of this examination may the student be enrolled as a candidate for the Doctor's degree. To pass a candidate for the doctoral degree in the preliminary examination there must be a two-thirds affirmative vote of the examining committee which

shall include a minimum of four affirmative votes. Students failing to pass this preliminary examination shall not be re-examined until at least one quarter has passed.

10. **Thesis**—Each candidate for an advanced degree (Master's or Doctor's) must submit a thesis unless, in the case of the Master's degree, Plan B (without thesis) is authorized. For the Master's degree the title of the thesis should be filed with the dean of the Graduate School at least six months prior to candidacy. A blank for reporting thesis title may be obtained in the Graduate School office. The subject must be approved by the adviser and by the Medical Graduate Committee. The topic should be within the field of the major. The thesis must be written in acceptable English. It must reflect ability to work independently and must give evidence of power to think independently both in perceiving problems and in making satisfactory progress toward their solution. Familiarity with the bibliography of the special field and correct citation of authorities are expected.

No material which has been published prior to its approval by the thesis committee may be used to meet the thesis requirement for any advanced degree. Candidates contemplating publication of any materials which they expect to present for a thesis should therefore arrange through the Graduate School office to obtain such approval.

The Master's thesis must be typewritten in quadruplicate, two copies on a special form of linen stock, the other two on lighter weight bond. Samples of the paper required should be examined in the dean's office. The original and first copy must contain all illustrative material. Ample margin should be left for binding purposes. The body of the thesis should be double spaced, but footnotes may be single spaced. The four copies of the thesis, certified by the adviser as complete, must be registered in the dean's office not later than five weeks before graduation. The thesis will be examined by a committee appointed by the dean on recommendation of the Medical Graduate Committee. Unanimous approval by the thesis committee is necessary for the acceptance of the thesis. If the thesis is accepted, the candidate must deposit with the office of admissions and records, at least three weeks before commencement, the sum of $1.50 for binding two copies of the thesis, which will be cataloged and deposited in the University Library.

For the Doctor's degree, a more elaborate thesis is required. The thesis must give evidence of originality and power of independent investigation. It must embody results of research forming a real contribution to knowledge and must exhibit a mastery of the literature of the subject and a familiarity with the sources of knowledge. The matter must be presented with a fair degree of literary skill.

The Doctor's thesis must be typewritten in quadruplicate, to facilitate reading by the thesis committee. The four copies, certified by the adviser as complete, must be registered in the dean's office and distributed to the thesis committee *not later than six weeks* before graduation. Unanimous approval by the thesis committee will be necessary for the acceptance of the thesis. Two copies are to be bound and deposited in the Graduate School office.

Each candidate for the Doctor's degree shall submit with his completed thesis a summary of about ten pages, acceptable to his adviser, embodying the principal findings of the research, and pay to the Graduate School the sum of $25 before the candidate be finally recommended for the degree. Such summaries will be published in appropriate volumes, and should therefore be carefully edited. If, prior to publication of the summaries, the candidate publishes his thesis through some other channel and files 100 reprints, approved by his adviser, the deposit will be refunded, less the cost of binding of the reprints with the required covers, title page, and vita.

The following directions for preparing the summary should be observed:

1. Original copy on good quality bond, double-spaced, student's name on each page.
2. Few references and those to be listed at the end of the summary.
3. Signature of the adviser following careful editing for both content and form.
4. No bibliography.

5. No acknowledgments.
6. Extra charges will be imposed for summaries exceeding ten pages in length and for summaries containing tables and plates.

11. **Final written examination**—In addition to the usual course examinations in all subjects where such are given, the candidate for the Master's degree must pass a final written examination in the field of the major. (No *special* final examination is required in the minor.) The final written examination will be held *not later than three weeks* before commencement. It is given by the members of the graduate faculty in the major department, the adviser acting as chairman. This examination shall cover all the work done in the major, and may include any work fundamental thereto.

For the Doctor's degree there shall be a written examination in the major subject, to be given by the members of the graduate faculty in the major department prior either to the preliminary or to the final examination or to both, as the department may decide. This examination shall cover all the work done in the major, and *may include any work fundamental thereto.*

12. **Final oral examination**—If all other requirements for the degree have been met, including the final written examination and the acceptance of the thesis, the final oral examination will be held not less than three weeks before commencement. All final examinations for the higher degrees in medicine will include questions on the history of medicine with special reference to the candidate's major field.

For the Master's degree the final oral examination will cover all the work offered for the degree, and may include other work fundamental thereto, and shall not exceed two hours. At the close of the examination, the committee will vote upon the candidate, taking into account all of his work. A majority vote is required for approval.

For the Doctor's degree the final oral examination shall cover the special field of knowledge represented by the major work, including the thesis problem, and shall not exceed three hours. Upon completion of the examination a formal vote of the committee shall be taken and a unanimous affirmative vote of the members shall be necessary for recommendation of the candidate for the degree.

13. **Recommendation by the faculty**—The dean will report to the executive committee of the graduate faculty the names of those who have completed the requirements for the Master's and Doctor's degrees, and those duly approved will be recommended by the faculty to the Board of Regents of the University. Unless excused by the dean of the Graduate School and the president of the University, all candidates are required to be present at commencement when the degrees are conferred.

A TABULAR SUMMARY OF REQUIREMENTS FOR THE MASTER'S DEGREE

Requirements	Under the Direction of	Date
Program, major and minor	Adviser and dean of the Graduate School or director of Mayo Foundation	On entrance
Approval of candidacy	Committee, normally from the major department, division, or college, and dean	After completion of 9 to 15 credits
Approval of thesis subject	Adviser and group committee	With application for candidacy
Language requirement	Adviser and language department	Before close of second quarter
Licensure	State Board	Six months after beginning graduate work
Filing of thesis	Graduate School office	Five weeks before graduation
Approval of thesis	Thesis committee	Before admission to final oral examination
Final written examination in major	Major department members of the graduate faculty	Not later than three weeks before commencement and before final oral examination
Final oral examination on all work	Committee. Date of examination fixed by Graduate School office	Not later than three weeks before commencement
Graduation fee and fee for binding thesis	Office of admissions and records	Not later than three weeks before commencement

(For the Master's degree in clinical subjects, the dates refer to the last year.)

A TABULAR SUMMARY OF REQUIREMENTS FOR THE DOCTOR'S DEGREE

Requirements	Under the Direction of	Date
First Year		
Selection of major	Adviser and dean of the Graduate School	
Selection of minor		
Second Year		
Three-year program	Adviser, Medical Graduate Committee, and dean of Graduate School	Before beginning work of second year
Application to take preliminary examination	Department committee and dean	With three-year program
Thesis title	Adviser, Medical Graduate Committee, and dean of Graduate School	Before admission to preliminary examination
Languages	Adviser and language departments	Before admission to preliminary examination
Recommendation	Major department	Before admission to preliminary examination
Preliminary examination, written	Graduate faculty of the major department	At time of preliminary oral or before the final oral examination
Preliminary examination, oral	Committee	At least seven months before degree is to be conferred
Third Year		
Filing of completed thesis certified by adviser	Graduate School office	Six weeks before graduation
Approval of thesis	Thesis committee	Before admission to final oral examination
Final oral examination	Committee. Date of examination fixed by Graduate School	Not later than three weeks before commencement
Two bound copies, summary of thesis, and deposit of $25	Graduate School office	Not later than three weeks before commencement
Release card	Graduate School office	Not later than three weeks before commencement
Graduation fee	Office of admissions and records	Not later than three weeks before commencement

DESCRIPTION OF COURSES AND OPPORTUNITIES

An asterisk (*) indicates courses that may be taken for independent work under Plan B, see page 10 in the *Graduate School Announcement, 1946-1948.*

A dagger (†) indicates that all quarters of a course preceding the dagger must be completed before credit is received for any quarter.

Courses numbered between 100 and 200 are open to both graduate and undergraduate students. Those numbered 200 or above are primarily for graduate students.

FOR GRADUATE TRAINING IN THE BASIC MEDICAL SCIENCES AND IN CLINICAL SPECIALTIES

It is deemed desirable that the graduate student in medicine be given the greatest possible freedom of choice in his plan of study. Rarely, if ever, have any two graduate students in medical fields in the University of Minnesota selected exactly the same type of work throughout their periods of residence.

The various divisions are grouped under the following departments:

1. Anatomy (including histology and embryology).
2. Bacteriology and Immunology.
3. Biophysics.
4. Biostatistics.
5. Cancer Biology.
6. Dentistry.
7. History of Science.
8. Medical Social Work.
9. Medicine (including Divisions of Internal Medicine, Nutrition, Dermatology and Syphilology, and Clinical Laboratory Medicine).
10. Neurology and Psychiatry.
11. Obstetrics and Gynecology.
12. Ophthalmology, Otology, Rhinology, and Laryngology (including Plastic Surgery).
13. Pathology.
14. Pediatrics.
15. Pharmaceutical Chemistry.
16. Pharmacognosy.
17. Pharmacology.
18. Physical Medicine.
19. Physiology.
20. Physiological Chemistry (Biochemistry).
21. Physiological Hygiene.
22. Public Health.
23. Radiology.
24. Surgery (including Divisions of General Surgery, Anesthesiology, Neurosurgery, Orthopedic Surgery, Proctology, and Urology).

In most departments the work is described in two separate groups: A—that given in the Medical School, and B—that given in the Mayo Foundation. All courses are numbered for purposes of registration. The courses offered in the Mayo Foundation are given the special prefix M. The suffixed f, w, s, and su indicate fall, winter, spring, and summer quarters, respectively. The hyphen denotes courses continuous through the quarters indicated. Suffixed letters separated by commas indicate the repetition of the course in the corresponding quarters.

ANATOMY

A. Courses Offered at the Medical School

Professors Edward A. Boyden, Ph.D., Chairman, Andrew T. Rasmussen, Ph.D., Richard E. Scammon, Ph.D., LL.D.; Associate Professors Berry Campbell, Ph.D., Arthur Kirschbaum, Ph.D., M.D., Lemen J. Wells, Ph.D.; Assistant Professors J. Francis Hartmann, Ph.D., R. Dorothy Sundberg, Ph.D., W. Lane Williams, Ph.D.

Prerequisites—The prerequisite work for all students who desire a major or minor in the Department of Anatomy includes general zoology, 9 credits, and advanced zoology or elementary courses in anatomy (including embryology, gross anatomy, histology, hematology, and neurology), 9 credits.

Major and minor work—Each student who desires a major in anatomy must have had the elementary courses in that branch of anatomy in which he desires to specialize—embryology, gross anatomy, hematology, histology, or neurology. Students majoring in clinical subjects who desire a minor in anatomy must have had as prerequisites the courses in anatomy usually required of medical students (including Courses 100-101, 103, 107, and 111).

Language requirement—Substitutions for the general Graduate School requirements are occasionally permitted by petition.

Master's degree—Work for the Master's degree is offered only under Plan A.

Doctor's degree—The Department of Anatomy provides excellent facilities for students who wish to take advanced work or to pursue investigations in anatomy leading to the Ph.D. degree.

COURSES

100-101. Gross Human Anatomy. Dissection, including osteology. 9 cred. per quarter. Enrolment limited. Dr. Boyden.

103. Human Histology. Microscopic study of the various tissues and organs. Prereq.: Course 100-101 or equiv. 9 cred. Dr. Kirschbaum.

107. Human Embryology. Development of the human body. Prereq.: Course 100-101 or equiv. 6 cred. Dr. Wells.

111. Human Neurology. A study of the gross and microscopic structure of the central nervous system and sense organs of man. Prereq.: Courses 103 and 107, or Zool. 149-150. 6 cred. Dr. Rasmussen.

115. History of Anatomy. Prereq.: Course 100-101. 2 cred. (Temporarily discontinued.)

116. Correlated Anatomy. Review of anatomy by dissections and demonstrations. Prereq.: Course 100-101. 2 cred. (Temporarily discontinued.)

129-130. Topographic Anatomy. Based upon a study of cross sections of the human body. Lect. and lab. Prereq.: Course 100-101. 2 cred. (or more) per quarter. (Temporarily discontinued.)

132. Anatomical and Functional Aspects of Reproduction. Lectures and demonstrations with experimental animals. 2 cred. Dr. Wells.

134. Anatomy of the Newborn. A detailed laboratory study of the anatomy of the newborn. Prereq.: Course 107 or equiv. 3 cred. per quarter. Dr. Wells.

149. Experimental Neurology. A study of the morphology of the central nervous system as determined by experimental methods. Preq.: Course 111. Hours and cred. ar. Dr. Campbell.
150. Special Topics in Neurology. Study of the literature in selected phases of human neurology. Prereq.: Course 111. Hours and cred. ar. Dr. Rasmussen.
153f,154w,155s,156su. Advanced Anatomy. Individual topics for advanced work in embryology, gross anatomy, hematology, histology, or neurology will be assigned to students who have completed the elementary courses in the corresponding subjects. Special courses are arranged for clinical graduate students. Hours and cred. ar. Dr. Boyden, Dr. Rasmussen, Dr. Campbell, Dr. Kirschbaum, Dr. Wells, Dr. Hartmann, Dr. Sundberg, Dr. Williams.
157. Developmental Anatomy of the Head. Prereq.: Course 107. 3 cred. Dr. Boyden. (Temporarily discontinued.)
158. Special Histology and Neurology of the Head Region. Prereq.: Courses 103, 111. 3 cred. Dr. Rasmussen.
159. Experimental Methods for the Study of Neoplastic Growths. Prereq.: Courses 103 and 165. Hours and cred. ar. Dr. Kirschbaum.
160. Seminar in Problems of Reproduction. Prereq.: Course 107. 1 cred. Dr. Wells.
161f-162w-163s. Quantitative Methods. Same as Courses 110-111, 120-121, 130-131 in Biostatistics. 5 cred. per quarter. Dr. Treloar and others.
165-166. Hematology. Normal and pathologic morphology of the blood and blood-forming organs, with special emphasis on the study of the blood from the standpoint of diagnosis and prognosis. Prereq.: Course 103 or equiv. 4 cred per quarter. Dr. Sundberg.
201f,202w,203s,204su. Research in Anatomy. Qualified students may undertake the investigation of problems in anatomy, including gross anatomy, embryology, histology, hematology, and neurology. Special facilities are offered to graduate students in the clinical departments for work upon problems in applied anatomy. Hours and cred. ar. Dr. Boyden, Dr. Rasmussen, Dr. Scammon, Dr. Campbell, Dr. Kirschbaum, Dr. Wells, Dr. Williams.
205f-206w-207s. Anatomical Seminar. Reviews of the current literature and discussion of research work being carried on in the department. Prereq.: reading knowledge of French and German desirable. 1 cred. per quarter. Dr. Boyden and staff.

BACTERIOLOGY AND IMMUNOLOGY

A. Courses Offered at the Medical School

Professors Robert G. Green, M.A., M.D., H. Orin Halvorson, Ch.E., Ph.D.; Associate Professors Milward L. Bayliss, M.D., Ph.D., Charles E. Skinner, Ph.D.; Assistant Professor William F. McLimans, Ph.D.

Master's degree—Work for the Master's degree is offered under Plan A, and Plan B may be followed in exceptional cases by petition.

Doctor's degree—Work toward the Ph.D. degree is offered in this department.

NOTE—For information on work in Cancer Biology, see pages 19 and 20.

COURSES

102s. Medical Bacteriology. See *Bulletin of the Medical School.* Prereq.: Course 101. 4 cred. Dr Green, Dr. Bayliss.
103f. Soil Microbiology. Studies of the microscopic inhabitants of the soil. Prereq.: Course 53 and 15 cred. in chemistry. 5 cred. Dr. Skinner.

104w. Sanitary Bacteriology. Standard and other methods for the bacteriological analysis of water, sewage, food, and dairy products. Preparation of standard culture media, technique, and evaluation of results. Primarily for majors in bacteriology. Limited to 15 students. Prereq.: 9 cred. in bacteriology. 4 cred. Dr. Skinner.

114s.* Molds, Yeasts, and Actinomycetes. Introduction to mycology: study of lower fungi important in medicine and industry. Prereq.: 9 cred. in bacteriology or 5 cred. in bacteriology and 4 cred. in plant pathology. 4 cred. Dr. Skinner.

116w.* Immunity. Laws of hemolysis; quantitative relationship between antigen and antibody; Wassermann reaction; opsonins; vaccines; toxin; antitoxin; precipitin reactions; blood grouping; atopy; anaphylaxis. Prereq.: Course 102. 3 cred. Dr. Green, Dr. McLimans.

120w.* Diseases of Animals Transmissible to Man. Detailed studies of plague, tularemia, undulant fever, typhus fever, spotted fever, and other human diseases obtained from animal reservoirs. Prereq.: Course 102. 3 cred. Dr. Green.

121f-122w.*† Physiology of Bacteria. Effect of environment on growth; enzymes; food requirements; carbohydrate, protein, and fat metabolism; products of growth; dormancy; death. Prereq.: Course 53 and 8 cred. in organic chemistry or biochemistry. 3 cred. per quarter. Dr. Halvorson.

123s. Applied Bacteriology. Industrial fermentations; bacteriology of water and sewage; interpretations of bacteriological data. Prereq.: Course 121-122. 3 cred. Dr. Halvorson.

124f. Filterable Viruses. Characters of filterable viruses; nature of virus infections; transmission of viruses by insects; important virus diseases of man and animals. Prereq.: Course 102, Anat. 103 or Zool. 149, and Path. 101. 4 cred. Dr. Green.

201f,w,s. Research in Bacteriology. Graduate students with the necessary preliminary training may elect research, either as majors or minors, in bacteriology. Hours and cred. ar. Dr. Green. Dr. Halvorson, Dr. Skinner, Dr. Bayliss, Dr. McLimans.

203f,w,s. Seminar in Bacteriology. 1 cred. Dr. McLimans.

204f-205w. Advanced Bacteriology. Special techniques in bacteriology: microscopy and photomicrography, methods for studying variation, quantitative methods. Cultivation and identification of anaerobes, etc. Methods of studying bacterial reactions catalyzed by enzymes. Prereq.: Course 121-122, which may be taken concurrently. 3 cred. per quarter. Dr. Halvorson.

B. Courses Offered in the Mayo Foundation

Professors Fordyce R. Heilman, M.D., Ph.D. in Bact., Thomas B. Magath, M.D., Ph.D., Arthur H. Sanford, M.A., M.D.; Associate Professor Lyle A. Weed, Ph.D., M.D.; Assistant Professor Luther Thompson, Ph.D.

Prerequisites—Opportunities for the graduate study of bacteriology and immunology occur in connection with routine clinical examinations and in special research. They are open to graduates in medicine or holders of Master's degrees who have had work in both bacteriology and pathology equivalent to that given in the medical course in the University.

COURSES

M251f,w,s,su. Clinical Bacteriology and Parasitology. Making and examination of cultures. Preparation and administration of autogenous vaccines. Serodiagnostic tests; special laboratory methods in clinical bacteriology or parasitology. Research in bacteriology and parasitology. Dr. Heilman, Dr. Magath, Dr. Sanford, Dr. Weed, Dr. Thompson.

M252f,w,s,su. Experimental Bacteriology. Research in the bacteriology of normal and diseased tissues, the blood, secretions, and exudates. Experimental inoculation of animals and immunological studies. So far as possible work limited to study of

pathogenesis and to development of specific methods of prevention and treatment of various diseases presumably of infective origin. Dr. Heilman.

In addition to the above, students majoring in bacteriology and immunology may take work in experimental physiology and biochemistry. For details, see these departments.

BIOPHYSICS

A. Courses Offered at the Medical School and in the Departments of Physics, Physiology, Radiology, and Zoology

Professors K. Wilhelm Stenstrom, Ph.D., Alfred O. Nier, Ph.D., John T. Tate, Ph.D., Joseph Valasek, Ph.D., John H. Williams, Ph.D.; Associate Professor Otto H. Schmitt.

Prerequisites—For work in biophysics, a Bachelor's degree with a major in physics is required.

Master's degree—Work for the Master's degree is offered only under Plan A.
Doctor's degree—This department offers work leading to the Ph.D. degree.

COURSES

Physiol.105s,su. Roentgen Rays, Light, and Radium. The physical and physiological basis of physical therapy. 1 cred. Dr. Stenstrom.

Physiol.170f,w,s,su. Problems in Biophysics. Investigations of the effects of Roentgen, radium, visible, and ultraviolet radiation may be undertaken. Instruments are available for spectrophotometric work in the visible and ultraviolet regions for temperature measurements by means of thermocouples, and to a certain extent for electrical measurements. Hours and cred. ar. Dr. Stenstrom.

Phys.101f-103w-105s. Theoretical Physics. Dr. Nier.

Phys.110w‡-112s.‡ Modern Experimental Physics. Radioactivity. Dr. Schmitt.

Phys.134f,w.‡ Experimental Optics. Dr. Valasek.

Phys.136w,s.‡ Spectrum Analysis. Dr. Valasek.

Other courses listed under Physics may be considered for credit in biophysics.

Rad.104f. Roentgen and Radium Therapy. Dr. Stenstrom.

Zool.155w.‡‡ Physiology in Relation to Physics. Application of the principles of physics to the investigation and interpretation of physiological phenomena. Lect. and demonstration. 3 cred. Ar.

Physiol.204f,w,s,su. Research in Biophysics. Students who want to carry out more extensive and independent investigations should register for this course instead of for Course 170. Hours and cred. ar. Dr. Stenstrom.

The physiology courses below may be taken for credit in biophysics:

Physiol.103w.¶ Physiology of Muscle, Circulation, Respiration, Digestion, Metabolism, and Nutrition. Several lectures on the medical aspects of genetics are included. Prereq.: organic chemistry and zoology. 9 cred. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

Physiol.104s. Physiology of Excretion, the Endocrines, the Nervous System, and Special Senses. Prereq.: Physiol. 103, or organic chemistry and neurology. 6 cred. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

B. Courses Offered in the Mayo Foundation

Professors Charles Sheard, Ph.D., D.Sc., Edward J. Baldes, Ph.D. in Phys., Ph.D. in Physiol.; Associate Professor Marvin M. D. Williams, Ph.D.; Assistant Professor John B. Bateman, Ph.D.

‡ A fee of $2 per quarter is charged for this course.
‡‡ A fee of $1.50 per quarter is charged for this course.
¶ Students may register for lectures without laboratory.

Graduate work of a research character is offered in biophysics. These researches are concerned chiefly with blood flow, blood pressure, osmotic pressure, bioelectric phenomena, electroencephalography, spectroscopy and spectrophotometry, energy exchanges between the body and its environment, biological effects of radiation, certain phases of physiological optics, and special problems in aero medicine.

Prerequisites—Opportunities for research for theses for the degree of doctor of philosophy are offered to a limited number of qualified fellows majoring in biophysics. In general, the Master's degree or its equivalent is a prerequisite for admission to these advanced research courses. In addition, facilities for experimental work are available to fellows majoring in other departments of surgical, clinical, and experimental work.

Minor—There are numerous problems suitable for minors for fellows majoring in other departments of surgical, clinical, and experimental work.

COURSES

M253f,w,s,su. Special Researches in Biophysics. Dr. Sheard, Dr. Baldes, Dr. Williams, Dr. Bateman.

In addition to the above, students in biophysics may do research work in physiology in the Foundation or at the Medical School, and in biology at the University in Minneapolis. For details, see these departments.

BIOSTATISTICS

A. Courses Offered in the Medical School

Professor Richard E. Scammon, Ph.D., LL.D.; Associate Professor Alan E. Treloar, Ph.D.; Assistant Professor Marian W. Thornton, Ph.D.; Instructor Jean Roberts, M.S.

Prerequisites—Courses in mathematics, economic statistics, and those sciences deemed necessary to a broad understanding of biological measurement, may be required in individual cases at the discretion of the adviser as part of the major program.

Language requirement—Substitutions for the general requirements of the Graduate School are permitted in special cases by petition.

Master's degree—Work for the Master's degree is offered under both Plan A and Plan B.

Doctor's degree—Work for the Ph.D. degree is offered in this department in accordance with the general requirements of the Graduate School.

COURSES

P.H.110f,s. Biometric Principles. An introduction to statistical analysis with emphasis on the basic principles of statistical reasoning. The description of univariate distributions, normal correlations, simple tests of significance, and goodness of fit. Prereq.: 18 cred. in biological science *or* mathematics through analytical geometry; Course 111 to be taken concurrently. 3 cred. Dr. Treloar, Dr. Thornton.

P.H.111f,s.‡ Biostatistics Laboratory. Practical training in machine calculation and statistical techniques discussed in Course 110, which is to be taken concurrently. 2 cred. Dr. Thornton.

P.H.120s. Correlation Analysis. Total, partial, and multiple normal correlation and regression; correlation ratio and curvilinear regression; contingency; biserial methods, tetrachoric and rank-order correlation; the symmetrical table. Prereq.: Course 110 or permission of instructor; Course 121 to be taken concurrently. 3 cred. Miss Roberts.

P.H.121s.‡ Correlation Laboratory. Practical training in techniques of correlation analysis. Prereq.: Course 120 to be taken concurrently. 2 cred. Miss Roberts.

‡ A fee of $1 per quarter is charged for this course.

P.H.130w. Random Sampling Distributions. A discussion of the sampling distributions of the more familiar statistics, the principles of statistical inference, and analysis of the problems of interpretation of differences, with special reference to small samples. Prereq.: Course 110 or permission of instructor; Course 131 should be taken concurrently. 3 cred. Dr. Treloar.

P.H.131w.‡ Sampling Laboratory. Study of the distributions of statistics derived from small samples by practical tests. Prereq.: to be taken concurrently with Course 130. 2 cred. Dr. Thornton.

P.H.140f.‡ Vital Statistics. Study of official sources of vital statistics, including population changes, calculation of rates, graphical exposition of trends, and tests of significance. Prereq.: permission of instructor. 3 cred. Dr. Treloar.

P.H.150w.‡ Life Tables. Mortality rates and the construction of the life table. Laboratory course with discussions, offered when sufficient demand exists. Prereq.: permission of instructor. 3 cred. Dr. Treloar.

P.H.200f,w,s.* Research in Biometry. Prereq.: permission of instructor. Cred. ar. Dr. Treloar, Dr. Thornton.

P.H.201f,w,s.* Topics in Biometry. Individual studies in special topics for advanced students by special arrangement. Prereq.: permission of instructor. Cred. ar. Staff.

P.H.211f,w,s.* Seminar in Biometry. Prereq.: permission of instructor. 1 cred. per quarter. Dr. Treloar.

B. Courses Offered in the Mayo Foundation

Associate Professor Joseph Berkson, M.A., M.D., D.Sc.

Opportunities for graduate work in biometry and medical statistics in the Mayo Foundation occur in connection with the Division of Biometry and Medical Statistics in the Mayo Clinic. These may include studies in clinical as well as laboratory fields.

COURSES

M254f,w,s,su. Research Problems in Biometry. Dr. Berkson.

CANCER BIOLOGY

Professor John J. Bittner, Ph.D., Chairman; Elexious T. Bell, M.D., Maurice B. Visscher, M.D., Ph.D.

Prerequisites—Graduate study in the field of cancer biology, leading to the Ph.D. degree, with a major in cancer biology, is offered to qualified students who have a broad background in basic sciences. Since cancer investigation is based upon several fundamental sciences, it is recommended that those intending to do graduate work in this field include in their undergraduate study vertebrate zoology, chemistry, physics, and modern languages.

Major—Candidates for the Ph.D. degree with a major in cancer biology may offer toward the major graduate work in any one of the following fields: cytology and organology, bacteriology, pathology, physiology, and genetics. Attendance at the seminar in cancer biology is required of all students in cancer biology. The thesis must deal with the field of the major.

Minor—It is suggested that students majoring in cancer biology present a minor in any one of the following fields: pathology, genetics, virology, bacteriology, physiology, biochemistry, cytology, histology.

‡ A fee of $1 per quarter is charged for this course.

COURSES

140f,w,s. Seminar in Cancer Biology. 1 cred. Dr. Bittner.
141f,w,s. Problems in Cancer Biology. Cred. and hours ar. Dr. Bittner.
207f,w,s. Research in Cancer Biology. Cred. and hours ar. Dr. Bittner.

DENTISTRY

A. Courses Offered at the School of Dentistry

Professors William H. Crawford, D.D.S., Wallace D. Armstrong, Ph.D., M.D., Henry B. Clark, Jr., M.D., D.D.S., Ambert B. Hall, D.D.S., William J. Simon, D.D.S., M.S.D., Harold C. Wittich, D.D.S.; Clinical Professors Max E. Ernst, D.D.S., Carl O. Flagstad, D.D.S., Raymond E. Johnson, D.D.S., Charles E. Rudolph, D.D.S., Lewis W. Thom, D.D.S., Carl W. Waldron, M.D., L.D.S., D.D.S.; Associate Professor Daniel A. Listiak, D.D.S.; Clinical Associate Professors Dorothea F. Radusch, D.D.S., M.S., Harold G. Worman, D.D.S.; Clinical Assistant Professors Axel P. Lund, M.S., Ph.D., D.D.S., Sherwood R. Steadman, D.D.S., M.S.

Graduate work for a limited number of properly prepared students is offered in certain fields of dental research and dental specialties. The work is under the direction of a joint committee in Dentistry and Medicine in the Graduate School.

Prerequisites—Candidates for admission must be graduates of an acceptable dental school with at least two years of preliminary general college work. They must also present or acquire sufficient training in the basic sciences, such as anatomy, bacteriology, pathology, physiological chemistry, and physiology, to enable them to apply these disciplines to research on some of the problems facing dentistry as one of the health sciences. The minimum training to meet this requirement at the University of Minnesota is in general the equivalent of that required of graduate students in the fields of clinical medicine. The basic science courses necessary as a foundation for advanced study are outlined under the departmental offerings in this bulletin.

Language requirement—Altho a reading knowledge of German is recommended as highly desirable, candidates for the Master's degree in dentistry are exempted from the foreign language requirement.

Majors—The fields of research and specialization in which work will be directed are investigative dentistry, oral surgery, orthodontia, periodontia, and restorative dentistry.

Master of science degree—Qualified students who give full time to their studies and absolve the requirements including a satisfactory thesis will normally require three years for the degree of master of science in dentistry.

COURSES

201f-202w-203s. Seminar in Orthodontics. A series of lectures and reports given weekly throughout the year. 1 cred. per quarter. Dr. Rudolph, Dr. Ernst, Dr. Steadman.
204f,w,s,su. Fundamental Research in Dentistry. A fully equipped laboratory is available for the biochemical or other objective means of investigation of fundamental problems relating to the teeth and other calcified tissues. The co-operation of the several departments of the Medical School is also available. Hours and cred. ar. Dr. Armstrong and staff.
207f-208w-209s. Oral Surgery. The work will consist of laboratory and clinical training in the fundamentals of surgical oral pathology, surgical diagnosis and treatment of injuries, infections, tumors, and abnormalities of the jaws and associated parts. The clinical work will be given at the School of Dentistry, the University Hospitals, and other hospitals. The major assignment will include a specific problem in oral surgery, for which the facilities of the research laboratories of the School of Dentistry,

as well as those of the Medical School, will be available. 3 cred. (or more) per quarter. Dr. Clark, Dr. Worman, and staff.

210f-211w-212s. Orthodontia. A course of lectures, seminars, demonstrations, and clinical work in the diagnosis and treatment of malocclusion of the teeth. Its aim is to prepare graduate students for the specialty of orthodontia. 3 cred. (or more) per quarter. Dr. Rudolph, Dr. Ernst. Dr. Steadman.

213f-214w-215s. Periodontia. Lectures, demonstrations, and clinical study of mouth infections, especially periodontoclasia. Methods of diagnosis, prevention as well as treatment, and the relationship of dietary deficiencies will be included. 3 cred. (or more) per quarter. Dr. R. E. Johnson, Dr. Radusch.

216f-217w-218s. Restorative Dentistry. The restoration of teeth to normal function and occlusion through operative procedures, and the replacement of missing teeth by fixed or removable bridge work and dentures. A study of the various materials and their manipulation as used in restorations. 3 cred. (or more) per quarter. Dr. Flagstad, Dr. Hall, Dr. Simon, Dr. Thom, Dr. Wittich, Dr. Listiak, Dr. Lund.

B. Courses Offered in the Mayo Foundation

Associate Professor Louie T. Austin, D.D.S.; Assistant Professor Edward C. Stafne, D.D.S.; Instructor Stanley A. Lovestedt, D.D.S., M.S. in Dent. Surg.

In addition to the graduate work in dentistry offered in the School of Dentistry, the Mayo Foundation offers assistantships in dental diagnosis and dental surgery to a limited number of graduates of class A dental colleges. Those contemplating graduate study leading to an advanced degree should register in the School of Dentistry.

Laboratory facilities are available in anatomy, bacteriology, biochemistry, dental radiography, experimental surgery, and pathology.

HISTORY OF SCIENCE

Richard E. Scammon, Ph.D., LL.D., Distinguished Professor in the Graduate School.

This course is open to qualified upper classmen and graduate students and may be taken as either a major or a minor subject for the Master's or the Doctor's degree. Permission of the instructor must be obtained and also that of instructors in cognate subjects. Credits arranged at time of registration.

No medical credits are allowed for this course unless specifically permitted by the dean of the medical sciences at the beginning of the course.

Courses in the history of science or courses in the history of particular sciences as well as courses in mathematics, logic, and biostatistics are recommended.

COURSES

190f-191w-192s-193su. History of Science. Course in the social history of science, open to qualified graduate and Senior College students in any field of scientific or historical specialization. Conferences, readings, and lectures. This course may count as major or minor on approval of the student's adviser in the Graduate School. Consult Professor Scammon before registering. Cred. ar.

201f-202w-203s-204su. Problems in Human Biology. Problems in the growth and distribution of human populations, in the serial development of the individual and its parts, in human developmental geometry, in statics of the human body, and in approaches to human biology by the newer methods of graphics, iconometrography, and applied mathematics. Permission of the instructor must be obtained. Cred. ar. Dr. Scammon.

MEDICAL SOCIAL WORK

For staff and courses of study offered, see Social Work in the *Graduate School Bulletin* for 1946-48.

MEDICINE

(Including Divisions of Internal Medicine, Nutrition, Dermatology and Syphilology, and Clinical Laboratory Medicine)

The graduate work in the Department of Medicine is designed to offer opportunities for gifted men and women to prepare themselves for the practice of internal medicine or any of its subdivisions as a specialty. It also aims to guide its fellows in research in these fields and to give them a start in university teaching. Prospective fellows who have had no special orientation in addition to that of the ordinary undergraduate courses will profit greatly from some special work. While any of the preclinical subjects might be of value, bacteriology, biochemistry, pathology, pharmacology, and physiology at the present are of the greatest importance. Work in any of these subjects may be continued further during the major studies in medicine to meet the requirements for a minor subject.

Internal Medicine

A. Courses Offered at the Medical School

Professors Cecil J. Watson, M.D., Ph.D., Director, Gerald T. Evans, M.D., Ph.D., George E. Fahr, M.D., J. Arthur Myers, M.D., Ph.D., Wesley W. Spink, M.D.; Clinical Professor Moses Barron, M.D.; Clinical Associate Professors Richard V. Ebert, M.D., Arthur C. Kerkhof, M.D., Ph.D., William B. Tucker, M.D.; Assistant Professors Edmund B. Flink, M.D., Ph.D., Frederick W. Hoffbauer, M.D., M.S., Ernest S. Mariette, M.D.; Clinical Assistant Professor George N. Aagaard, M.D.

A wide range of clinical material is afforded for graduate work in internal medicine at the University of Minnesota Hospitals, the Minneapolis General Hospital, the Ancker Hospital in St. Paul, and the Veterans Hospital in Minneapolis. This material is found both in the wards and in the out-patient departments. There are opportunities for research in the laboratories of the Department of Medicine at the University and at the Veterans Hospital, as well as in the general laboratories for basal metabolism, biochemistry, electrocardiography, and hematology in all of the hospitals.

Anatomy, bacteriology, biochemistry, immunology, pathology, pharmacology, and physiology all have their laboratories and teaching centers on the campus, and the pursuit of a minor subject to the extent required by the Graduate School may be carried on simultaneously and in intimate relation with the more definitely clinical studies. The large autopsy material of the Department of Pathology provides experience in this field as well as control of clinical diagnosis.

The more intensive clinical studies of the fellow or graduate student in medicine are carried on in one or more of the hospitals mentioned, and the out-patient departments are utilized to the degree necessary for training the fellow in the type of work to be met with later in practice.

In general the fellowship is planned for a four-year period, of which from one to one and one-half years are devoted to basic science and research and two and one-half to three years to clinical medicine and research. During the greater part of the latter period the individual will act as assistant resident physician or as resident physician in one of the hospitals. In this position he has to assume greater responsibility in the care of the patient than during the period of internship. The fellow in medicine is required to devote a certain amount of time to teaching.

Besides the clinical work, a fellowship also includes research towards the fulfillment of the requirements for an acceptable thesis, either for an M.S. or a Ph.D. degree. This work may be purely clinical, but a combined clinical and laboratory study is preferable and is essential for a Ph.D. thesis.

The courses listed below are described in the broadest outline for purposes of recording the character of the work done. No hard and fast program is contemplated, the individual capabilities and the purposes of the fellow being given particular attention.

COURSES

201f,w,s,su. Clinical Medicine. Study of general diagnosis and methods of investigation and of the recording of clinical data. Emphasis placed on methods of treatment. Cred. ar. Dr. Watson, Dr. Fahr, Dr. Myers, Dr. Spink, Dr. Ebert, Dr. Tucker, Dr. Aagaard, Dr. Flink, Dr. Hoffbauer.

202f,w,s,su. Diseases of the Cardiovascular Apparatus. Special study of diseases of the heart and blood vessels, including technique and application of the polygraphs, electrocardiograph, and interpretation of outlines of the heart and great vessels obtained by means of radiograms and orthodiagram. Minneapolis General Hospital and University Hospital Cardiac Clinic. Cred. ar. Dr. Fahr.

203f,w,s,su. Research in Medicine. Study of a clinical or fundamental problem related to internal medicine. The fundamental type is necessary for the Ph.D. thesis, while the purely clinical type is permissible for the M.S. thesis. Cred. ar. Dr. Watson, Dr. Fahr, Dr. Spink, Dr. Ebert, Dr. Tucker, Dr. Aagaard, Dr. Flink, Dr. Hoffbauer.

205f,w,s,su. Tuberculosis. Opportunities in the study of problems relating to tuberculosis are offered. Problems may be studied both from the clinical and laboratory standpoint. An out-patient department is also available. Cred. ar. Dr. Myers.

206f,w,s,su. Clinical Conference. Presentation of problem cases from the Medical Service. Discussion of diagnosis and treatment and consideration of pertinent literature. 1 cred. Dr. Watson, Dr. Ebert, and staff.

207f,w,s,su. Clinical Pathological Conference. Presentation of clinical features, necropsy findings, and discussion. Medical and surgical cases. 1 cred. Dr. Bell, Dr. Watson, Dr. Ebert, and staff.

208f,w,s,su. Clinical Radiological Conference. Presentation and discussion of X-ray films from the Medical Service, with clinical correlation. 1 cred. Dr. Rigler, Dr. Watson, Dr. Ebert, and staff.

209f,w,s,su. Psychosomatic Medicine. One hour weekly. 1 cred. Dr. Hastings.

210f,w,s,su. Infectious Disease Seminar. One hour weekly. 1 cred. Dr. Spink.

211f,w,s,su. Electrocardiographic Conference. One hour weekly. 1 cred. Dr. Aagaard.

B. Courses Offered in the Mayo Foundation

Professors Russell M. Wilder, M.D., Ph.D., Walter C. Alvarez, M.D., Arlie R. Barnes, M.D., M.A., M.S. in Med., Walter M. Boothby, M.D., M.A., Mandred W. Comfort, M.D., M.S. in Neur., George B. Eusterman, M.D., Herbert Z. Giffin, M.D., Samuel F. Haines, M.D., M.S. in Med., Norman M. Keith, M.D., Edwin J. Kepler, M.D., M.S. in Med., Albert M. Snell, M.D., M.S. in Med., Fredrick A. Willius, M.D., M.S. in Med.

Associate Professors Edgar V. Allen, M.D., M.A., M.S. in Med., J. Arnold Bargen, M.D., M.S. in Med., Nelson W. Barker, M.D., M.S. in Med., Philip W. Brown, M.D., M.S. in Med., Della G. Drips, M.S., M.D., Thomas J. Dry, M.A., Ch.B., M.B., M.S. in Med., Fred W. Gaarde, M.D., Howard R. Hartman, M.D., Frank J. Heck, M.D., M.S. in Path., Philip S. Hench, M.D., M.S. in Med., Edgar A. Hines, M.D., M.A., M.S. in Med., H. Corwin Hinshaw, M.D., Ph.D., Bayard T. Horton, M.D.,

M.S. in Med., Charles K. Maytum, M.D., Herman J. Moersch, M.D., M.S. in Med., William A. Plummer, M.D., Edward H. Rynearson, M.D., M.S. in Med., H. Leroy Smith, M.D., M.S. in Med., Elmer G. Wakefield, M.D., Charles H. Watkins, M.D., Ph.D., James F. Weir, M.D., M.S. in Med.

Assistant Professors David M. Berkman, M.D., M.S. in Med., John M. Berkman, M.D., M.S. in Med., Alex E. Brown, M.D., M.S. in Med., Howard B. Burchell, M.D., Ph.D. in Med., Hugh R. Butt, M.D., M.S in Med., Austin C. Davis, M.D., Harold C. Habein, M.D., Byron E. Hall, M.D., Ph.D., Dorr F. Hallenbeck, M.D., Wallace E. Herrell, M.D., M.S. in Med., Walter F. Kvale, M.D., M.S. in Med., D. Morrison Masson, M.D., Carl G. Morlock, M.D., M.S. in Med., Arthur M. Olsen, M.D., M.S. in Med., Robert L. Parker, M.D., M.S. in Med., Monte C. Piper, M.D., Lee W. Pollock, M.D., Louis E. Prickman, M.D., M.S. in Med., Andrew B. Rivers, M.D., M.S. in Med., M.A., Herbert W. Schmidt, M.D., M.S. in Med., Charles H. Slocumb, M.S., M.D., J. Minott Stickney, MD., M.S. in Med., Jan H. Tillisch, M.D., M.S. in Med., Harry G. Wood, M.D.

Instructors Mark J. Anderson, M.D., Harry C. Browne,¶ M.D., M.S. in Med., Donald C. Campbell, M.D., M.S. in Med., Haddon M. Carryer, M.D., M.S., Guy W. Daugherty,¶ M.D., M.S. in Med., William H. Dearing, M.A., M.D., Ph.D. in Med., Earl E. Gambill, M.D., M.S. in Med., Malcolm M. Hargraves, M.D., Corrin H. Hodgson, M.D., M.S. in Med., Llewelyn P. Howell, M.D., M.S. in Med., F. Raymond Keating, M.D., M.S. in Med., Giles A. Koelsche, M.D., Ph.D. in Med., Wallace A. Merritt, M.D., M.S. in Med., Donald R. Nichols, M.D., M.S. in Med., Howard M. Odel, M.D., M.S. in Med., Stanley W. Olson, M.D., M.S. in Med., Raymond D. Pruitt, M.D., M.S. in Med., Charles H. Scheifley, M.D., M.S. in Med., R. Montgomery Shick, M.D., M.S. in Med., Lucian A. Smith, M.D., M.S. in Med., Randall G. Sprague, M.D., Ph.D. in Med., Charles F. Stroebel, M.D., M.S. in Med., Larry O. Underdahl, M.D., M.S. in Med., Louis D. Vaughn, M.D., M.S. in Med., Eric E. Wollaeger, M.D., M.S. in Med.

The clinical work in internal medicine in Rochester consists of diagnostic work in the clinic or in the hospital medical services, includes history taking, physical examinations, the recommendation of patients for special examinations with correlation of the results thereof, and the formation of independent judgments concerning diagnoses and indications and recommendations for medical and surgical treatment. This work is under the immediate direction of the consulting physicians of the section in which the fellow is working.

Each service consists of six days each week for six months, except as noted, in a clinical section. There are sixteen general diagnostic sections in which the fellow may work in the clinic and twenty medical hospital services. Each diagnostic section contains three or more consulting physicians, and is referred to by the name of the physician who is the administrative head. Each of the general diagnostic sections is general in the sense that any patient may be referred to any one of them. Many of them, however, are special in that they have fields of intensive interest as follows: Sections headed by Dr. Haines, Dr. Plummer, Diseases of the Thyroid, Metabolism; by Dr. Habein, Dr. Herrell, Acute Abdominal Diseases; by Dr. Bargen, Intestinal Diseases; by Dr. Maytum, Allergic Diseases; by Dr. Moersch, Diseases of the Chest, Bronchoscopy and Esophagoscopy; by Dr. Watkins, Diseases of the Blood; by Dr. Allen, Dr. Horton, Vascular Diseases; by Dr. H. L. Smith, Diseases of the Heart; by Dr. Barnes, Cardiovascular and Renal Diseases; by Dr. Snell, Dr. Hartman, Gastrohepatic Diseases; by Dr. Mussey, Dr. Randall, Gynecologic Diseases; by Dr. Hench, Arthritic Diseases.

The satisfactory completion of at least two services of six months each in these sections is required for recommendation for an advanced degree. When he is sufficiently

¶ On leave for military service

competent in clinical work the fellow may be appointed to a first assistantship in the Mayo Clinic for a period of one year.

The Medical Department has available between four and five hundred beds in the several hospitals.

All fellows desiring autopsy experience may take a service of six months or more in the Section of Pathologic Anatomy. (Such a service gives good experience in autopsy technique and diagnosis.)

In graduate work in medicine the didactic lecture plays but a minor role. In the diagnostic clinic and hospitals much of the teaching is done in seminars, ward rounds, and by contact between the member of the faculty and the fellow in the handling of the patients, or in the carrying out of laboratory procedures. In both clinical and hospital sections the fellow assists in the actual work of these sections under the supervision of the head of the section and his associates.

In clinical seminars cases of unusual interest are discussed and presented. In the hospital services additional seminars and conferences are conducted on special phases of medicine, on laboratory methods, and on current medical literature. Clinico-pathologic conferences are conducted in cases coming to necropsy. In these seminars the fellows themselves play an active role in presenting to the group cases or subjects which have been assigned to them.

In the laboratories fellows are given every opportunity to work out for themselves the problems of their choice or to participate in investigations being carried out by members of the staff.

As soon as he becomes oriented, each fellow is expected to find time, in addition to his routine work, to begin to carry forward consistently some research. While it may be purely clinical, in most instances it will be found to have relationships requiring detailed study in bacteriology, hematology, pathology, physiological chemistry, or physiology.

Tho the minimum time required for recommendation for the degree of master of science or doctor of philosophy for work done in these fields is three years, it is found that considerably more time is often desirable.

COURSES

M255f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis. Research. Seminar. Dr. Wilder, Dr. Barnes, Dr. Haines, Dr. Mussey, Dr. Snell, Dr. Willius, Dr. Allen, Dr. Bargen, Dr. Hartman, Dr. Heck, Dr. Hench, Dr. Maytum, Dr. Moersch, Dr. Plummer, Dr. Randall, Dr. Watkins, Dr. D. M. Berkman, Dr. Habein, and associates.

M256f,w,s,su. Medical Hospital Residence. Research. Seminar. Dr. Wilder, Dr. Barnes, Dr. Haines, Dr. Snell, Dr. Willius, Dr. Allen, Dr. Bargen, Dr. Hartman, Dr. Heck, Dr. Hench, Dr. Maytum, Dr. Horton, Dr. Moersch, Dr. Plummer, Dr. Habein, Dr. Herrell, and associates.

M263f-w,w-s,s-su,su-f. Diagnosis in Neurology and Psychiatry. (See Division of Neurology and Psychiatry.)

M283f,w,s,su. Clinical Pathology. (See Department of Pathology.)

M286f-w,w-s,s-su,su-f. Necropsy Service. (See Department of Pathology.)

M293f-w,w-s,s-su,su-f. Research Work on Selected Problems in Experimental Physiology. (See Departments of Physiology and Physiological Biochemistry.)

In addition to the above, fellows majoring in internal medicine may take work in biochemistry, biophysics, dermatology, experimental physiology, ophthalmology, pediatrics, physical medicine, psychiatry, radium therapy, and Roentgen therapy. For details, see these departments.

Nutrition

B. Courses Offered in the Mayo Foundation

Professor Russell M. Wilder, M.D., Ph.D.

Opportunity is provided for a few fellows majoring in nutrition. This work is under the supervision of the Departments of Medicine, Biochemistry, Physiology, and Physiological Biochemistry.

COURSES

M257f,w,s,su. Nutrition. Dr. Wilder.

Dermatology and Syphilology

A. Courses offered at the Medical School

Professor Henry E. Michelson, M.D., Director; Clinical Associate Professors Carl W. Laymon, M.D., Ph.D., Francis W. Lynch, M.D., M.S.

Graduate instruction in dermatology and syphilology is offered at the University Hospitals, the Minneapolis General Hospital, the Veterans Hospital in Minneapolis, and the Ancker Hospital in St. Paul, combined with attendance at the clinics at the four hospitals. A limited number of graduate students are appointed as residents in dermatology, rotating in these hospitals. The student is required to devote full time and is not permitted to carry on any outside practice. He is eligible for a master of science or a doctor of philosophy degree if the requirements are fulfilled. All graduate students majoring in dermatology and syphilology are required to carry on independent research under the direction of Dr. Michelson and the head of the department or division in which he wishes to do special research.

COURSES

225f,w,s,su. Clinical Dermatology and Syphilology. Wards and out-patient departments of the University Hospitals, Veterans Hospital, Minneapolis General Hospital, and Ancker Hospital. Cred. ar. Dr. Michelson and staff.

226f,w,s,su. Dermatology and Allergy. Conference twice weekly on diagnosis and treatment of skin conditions. Dr. Michelson and staff.

227f,w,s,su. Histopathology of the Skin. Cred. ar. Dr. Michelson and staff.

228f,w,s,su. Research in Dermatology and Syphilology. Cred. ar. Dr. Michelson and staff.

B. Courses Offered in the Mayo Foundation

Professor Paul A. O'Leary, M.D.; Associate Professors Louis A. Brunsting, M.D., M.S. in Derm. and Syph., Hamilton Montgomery, M.D., M.S. in Derm. and Syph.; Assistant Professor Robert R. Kierland, M.D., M.S. in Derm. and Syph.

The Department of Dermatology and Syphilology of the Mayo Foundation affords opportunity for the study of a large volume of patients with a great variety of cutaneous diseases and syphilis. A close working relationship between this department and the sections of internal medicine is especially emphasized.

A dermato-histopathologic laboratory with a comprehensive collection of slides is augmented by approximately 800 biopsies each year. General laboratories of the Clinic and Foundation are available for routine and investigative work, and a six months' service in the hospital (45 beds) is part of the three-year training offered.

COURSES

M258f,w,s,su. Histopathology of the Skin. Lab. and lect. Dr. Montgomery.

M259f,w,s,su. Diagnosis with Special Reference to Dermatology and Syphilology. Daily seminary. Clinical conference. Dr. O'Leary, Dr. Brunsting, Dr. Montgomery, Dr. Kierland.

M260f,w,s,su. Hospital Residence. Care of hospitalized patients. Seminar. Dr. O'Leary, Dr. Brunsting, Dr. Montgomery, Dr. Kierland.

In addition to the above, fellows majoring in dermatology and syphilology may receive instruction in allergy, hematology, mycology, Roentgen and radium therapy, and serology. Biochemistry, biophysics, and experimental physiology may be elected, if desired. For details see these departments.

Clinical Laboratory Medicine

Professor Gerald T. Evans, M.D.C.M., Ph.D., Director.

The clinical laboratories (bacteriology and immunology, including blood bank, chemistry and metabolism, electrocardiography, hematology, morphologic pathology, parasitology) are administratively integrated, but each unit is under the professional charge of a specially assigned member of the appropriate fundamental department. Credits obtained in this field may be used in the above listed areas at the discretion of the adviser.

Fellows in training in internal medicine and in clinical pathology are regularly accepted for a six- and twelve-month rotating experience through the clinical laboratories. The rotation does not include morphologic pathology. Besides gaining experience with the principal techniques and their interpretation, special small problems and reading courses are assigned. Emphasis is placed upon recourse to the fundamental sciences and to current literature in investigative medicine.

In addition one-year renewable fellowships are available for suitably prepared persons wishing to spend their time principally on clinical or clinical laboratory research.

COURSES

235f,w,s,su. Advanced Clinical Laboratory Medicine. General rotation as above described. Prereq.: Anat. 165, 166 (Hematology). Dr. Evans and staff.

236f,w,s,su. Research on clinical or clinical laboratory problems. Dr. Evans and staff.

NEUROLOGY AND PSYCHIATRY

A. Courses Offered at the Medical School

Professor Donald W. Hastings, M.D., Head; Clinical Professor Ernest M. Hammes, M.D.; Associate Professors A. B. Baker, M.D., Ph.D., Starke R. Hathaway, Ph.D., Burtrum C. Schiele, M.D.; Clinical Associate Professor Harold H. Noran, M.D.; Clinical Assistant Professors Russell A. Anthony, M.D., Joe R. Brown, M.D., Clifford O. Erickson, M.D., Roger W. Howell, M.D., Marvin Sukov, M.D.

Excellent facilities are available to fellows in neurology and psychiatry for work in the major field. The minor may be elected in anatomy, pathology, physiology, psychology, or other basic fields. Elective course work in any of the university departments fundamental to, or allied with, neurology and psychiatry may be arranged with the approval of the adviser.

In addition to the work in the University Hospitals on the Neurologic Service, in the Psychopathic Unit, the Juvenile Clinic, and the Out-patient Department, the student has access to the Minneapolis General Hospital.

The fellow is given a clinical assignment in the in-patient and the out-patient services of the University Hospitals and is responsible to his service chief for the clinical study and therapy of his patients. He makes daily informal rounds with his superior staff, has weekly clinical conferences with the director of the department, and prepares cases for presentation at formal weekly staff conferences and at the clinic given to undergraduate medical students. He helps conduct the pedagogical work of the clerkship of medical students. He reports on the literature or on his special studies in staff conferences from time to time.

COURSES

208su,f,w,s. Clinical Neurology. Supervised practice, in-patient and out-patient services. Hours and cred. ar. Dr. Baker, Dr. Schiele.

208x,su,f,w,s. Clinical Psychiatry. Supervised practice, in-patient and out-patient services. Hours and cred. ar. Dr. Hastings, Dr. Baker, Dr. Schiele.

209su,f,w,s. Research in Neurology and Psychiatry. Hours and cred. ar. Dr. Hastings, Dr. Baker, Dr. Hathaway.

210f. Advanced Neuropathology. Prereq.: Path. 101, 102. 2 cred. Dr. Baker.

211w,s. Intracranial Neoplasms. (Same as Path. 116.) Prereq.: Path. 101, 102. Dr. Baker.

212su,f,w,s. Survey of Neuropathology. Prereq.: Med. 210. 1 cred. per quarter. Dr. Baker.

213w. Orientation in Psychiatric Social Service. 1 cred. Dr. Hastings, Miss Henry.

214w. Neuropsychiatric Disorders of Childhood. Didactic Conferences. 1 cred. Staff.

215f,w,s.† Seminar in the Application of Psychological Methods to the Study of Neuropsychiatry. 1 cred. per quarter. Dr. Hathaway.

216su,f,w,s. Neuropsychiatric Case Conference. Hours and cred. ar. Dr. Hastings and staff.

217s. Didactic Review of Psychoanalytical Theory. 1 cred. Dr. Lippman.

218su,f,w,s. Child Neuropsychiatry. Clinical experience in Juvenile Clinic. Hours and cred. ar. Staff.

219f,w,s.† Personality structure, normal and abnormal. 1 cred. per quarter. Dr. Schiele, Dr. Hathaway.

220f-w-s. Advanced Clinical Neurology. Selected readings and comprehensive review of specialized subjects in the neurological field. Hours and cred. ar. Dr. Baker and staff.

221f,w,s. Psychometric Clerkship. Psychological testing of in-patient and out-patient cases in the University Hospitals. Hours and cred. ar. Dr. Hathaway.

222f,w,†s. Interviewing Techniques in Psychiatry. Supervised practice and demonstration. 1 cred. per quarter. Dr. Hastings and staff.

223w,s. History of Neuropsychiatry. A study of major trends in diagnosis and treatment. 1 cred. Dr. Hastings and staff.

224f,w,s. Survey of Psychiatry. 4 cred. Dr. Hastings and staff.

225f. Neuro-ophthalmology. Series of lectures covering the field of ophthalmology as related to neurology. Prereq.: to be arranged with instructor. 2 cred. Dr. Baker.

226f,w,s. Neurological-Neurosurgical Conference. (Same as Surgery 318.) Review of X rays, case histories, and neuropathological material on neurological and neurosurgical cases. 1 cred. Dr. Baker.

227f,w,s. Seminar in Psychiatry. 1 cred. Dr. Schiele.

228f,w,s,su. Research in Neuropathology. Hours and cred. ar. Dr. Baker, Dr. Noran.

229f. Clinical Neurophysiology. A review of the neurophysiological concepts that have clinical application. Hours and cred. ar. Dr. Anthony.

230w. Electroencephalography. Hours and cred. ar. Dr. Anthony.

231f,w,s,su. Applied Electroencephalography and Myography. Practical experience in the reading and interpretation of electroencephalographic tracings. Hours and cred. ar. Dr. Anthony.

232f,w,s,su. Applied Neuroroentgenology. Experience in the actual reading of neuroroentgenological films. Hours and cred. ar. Dr. Peterson.

233f,w,s,su. Applied Neuropathology. Hours and cred. ar. Dr. Noran.

234. History of Neurology. Hours and cred. ar. Dr. Brown.

235. Neurology in other Medical Specialties. Hours and cred. ar. Dr. Baker and staff.

B. Courses Offered in the Mayo Foundation

Professors Henry W. Woltman, M.D., Ph.D. in Neur., Francis J. Braceland, M.D., Kendall B. Corbin, M.D., Frederick P. Moersch, M.D., Harry L. Parker, Ch.B., B.A.O., M.S. in Neur.; Associate Professors Lealdes M. Eaton, M.D., M.S. in Neur., Magnus C. Peterson, M.D.; Assistant Professors Alexander R. MacLean, M.D., M.S. in Neur., Maurice N. Walsh, M.D., M.S. in Neur. and Psych.; Instructors Philip H. Heersema, M.D., Waldemar C. Rasmussen, M.D.

A practical clinical course for fellows in neurology and psychiatry is conducted. Besides clinical work this includes a daily conference on cases of special diagnostic importance, a weekly conference for the review of current neurologic and psychiatric literature, and a weekly clinical pathological conference for the study of autopsy material. For fellows majoring in neurology special work in electroencephalography, neuropathology, neuroanatomy, and neuro-ophthalmology is offered.

Opportunities in psychiatry in the clinic are now supplemented by residencies in the Rochester State Hospital for the Insane. These are granted only to fellows with adequate preparation in neurology and psychiatry. They are for a minimum period of six months. In addition to the usual fellowship stipends these fellowships provide maintenance during the period of residence.

This department is closely associated with the Department of Ophthalmology and Otolaryngology, and with various laboratories for the study of neurology as a specialty and its relationship to general medicine.

COURSES

158s. Anatomy. Special Histology and Neurology of the Head Region. Dr. Rasmussen. (See Anatomy 158.)

M261f,w,s,su. Neuropathology. Open to fellows who are majoring in neurology and who have had adequate preparation in general pathology. Dr. Kernohan.

M262f,w,s,su. Neurophysiology. Electroencephalography. Dr. Baldes, Dr. Williams.

M263f-w,w-s,s-su,su-f. Diagnosis in Neurology and Psychiatry. Research. Seminar. Dr. Woltman, Dr. Braceland, Dr. Moersch, Dr. Parker, Dr. Eaton, Dr. MacLean, Dr. Walsh, Dr. Heersema, Dr. Rasmussen.

M264f,w,s,su. Hospital Residence in Neurology and Psychology. Research. Seminar. Dr. Woltman, Dr. Braceland, Dr. Moersch, Dr. Parker, Dr. MacLean, Dr. Walsh, Dr. Heersema, Dr. Rasmussen.

M265f,w,s,su. Special Psychiatry at the Rochester State Hospital for the Insane. Residence. Dr. Peterson, Dr. Heersema.

M274f,w,s,su. Neuro-ophthalmology. (See Ophthalmology 274.) Dr. Wagener, Dr. Rucker.

In addition to the above, fellows majoring in neurology may take work in experimental physiology, necropsy service, and neuro-ophthalmology. For details, see these departments.

OBSTETRICS AND GYNECOLOGY

A. Courses Offered at the Medical School

Professor John L. McKelvey, M.D.C.M., Head; Clinical Assistant Professor Leonard A. Lang, M.D., and staff.

COURSES

201f-202w-203s-204su. Advanced Obstetrics and Gynecology. Includes service in the University Hospitals or Minneapolis General Hospital, affording ample opportunity for experience in diagnosis, care, and treatment (operative and nonoperative) of patients. Special facilities are offered for study of problems and cases of unusual interest. Required of first year fellows. Dr. McKelvey and staff.

205f-206w-207s-208su. Similar to Course 201-204, but more advanced, both in clinical and research aspects of the subjects adapted to the increased training and experience. Required of second year fellows. Dr. McKelvey and staff.

209f-210w-211s-212su. Similar to Courses 201-204 and 205-208, but more advanced. Required of third year fellows. Dr. McKelvey and staff.

213f-214w-215s. Staff Conference Seminar. A conference, including the fellows and graduate students. Presentation and discussion of original work and reports upon the current literature in obstetrics and gynecology. Dr. McKelvey and staff.

216f-217w-218s-219su. Research. Clinical and laboratory research upon problems in obstetrics and gynecology. Required of third year fellows, who must complete a satisfactory thesis during the year. Elective for second year fellows or other properly qualified graduate students. Dr. McKelvey and staff.

221f-222w-223s-224su. Clinical Obstetrics and Gynecology. A course in diagnosis and treatment, with special study of selected cases. Clinic in the Out-patient Department of the University Hospitals. Required of teaching fellows. Dr. McKelvey and staff.

B. Courses Offered in the Mayo Foundation

Professors Robert D. Mussey, M.D., Lawrence M. Randall, M.D., M.S. in Obst. and Gynec.; Associate Professors Della G. Drips, M.D., M.S., Arthur B. Hunt, M.D., M.S. in Obst. and Gynec.; Assistant Professor Lois A. Day, M.S., M.D., M.S. in Obst. and Gynec.; Instructor Sim B. Lovelady, M.D., M.S. in Obst. and Gynec.

For fellows majoring in obstetrics and gynecology opportunity is available for extensive experience in diagnosis and treatment of gynecologic diseases and obstetrics, supplemented by studies in basic sciences underlying the specialty, and in operative surgery in sections concerned principally with gynecologic conditions. Weekly seminars are held regularly.

COURSES

M255f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis, principally in relation to obstetrics and gynecologic conditions. Research. Seminar. Dr. Mussey, Dr. Randall, Dr. Drips, Dr. Hunt, Dr. Day, Dr. Lovelady. (See Department of Medicine.)

M269f-w,w-s,s-su,su-f. Clinical Obstetrics and Gynecology. Diagnosis and treatment with special study of selected obstetric and gynecologic cases. Residence. Seminar. Dr. Mussey, Dr. Randall, Dr. Hunt, Dr. Day, Dr. Lovelady.

M287f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. (See Department of Pathology.)

M303f,w,s,su. Operative Surgery. Dr. Counseller, Dr. Waugh, Dr. Ferris. (See Department of Surgery.)

In addition to the above, students majoring in obstetrics and gynecology may take work in experimental physiology, radium therapy, and regional anesthesia. For details, see these departments.

OPHTHALMOLOGY, OTOLOGY, RHINOLOGY, AND LARYNGOLOGY

The graduate courses in these subjects are designed to prepare selected men for advanced work in the various lines, to prepare them for practice in these specialties, and to develop research and productive work in these subjects. Of elective courses in other departments, the following are highly desirable:

Physics of Light and Acoustics
Advanced Anatomy of the Head and Neck
Topographic Anatomy of the Head and Neck
Developmental Anatomy of the Head

OPHTHALMOLOGY

A. Courses Offered at the Medical School

Clinical Professor Erling W. Hansen, M.D., Director; Clinical Associate Professor Hendrie W. Grant, M.S., M.D.; Clinical Assistant Professors Edward P. Burch, M.D., Walter E. Camp, M.A., M.D., Walter Hoffman, M.S., M.D., Charles Hymes, M.S., M.D., Malcolm C. Pfunder, M.D., Virgil J. Schwartz, M.D., Charles E. Stanford, M.D.; Clinical Instructors Thomas J. Edwards, M.D., Francis M. Walsh, M.S., M.D.

COURSES

100f. Ophthalmology. Lect. and demonstrations. 20 hours. 2 cred. Dr. Erling W. Hansen and staff.

103f,w,s,su. Clinic in Diseases of the Eye. Diagnosis and treatment of cases. Part of the required section clinics, surgical clerkship period. 45 hours. 4 cred. University Dispensary. Dr. Hansen, Dr. Stanford, Dr. Hoffman.

107f,w,s. Medical and Neurological Ophthalmology. Limited to sixteen students. 2 sections. 22 hours. 2 cred. Todd Memorial Room. Dr. Stanford, Dr. Schwartz, Dr. Lindberg.

153f,154w,155s,156su. Advanced Anatomy of Eye and Adnexa. (See Anatomy 153, 154, 155, 156.)

200f,w,s. Refraction. 22 hours per quarter. 2 cred. per quarter. Dr. Tracht.

201f,w,s. Advanced Refraction. 22 hours per quarter. 2 cred. per quarter. Dr. Tracht.

202f,w,s. Clinical Ophthalmology. 132 hours per quarter. 12 cred. per quarter. Dr. Hansen and staff.

203f. Biomicroscopy. 12 hours. 1 cred. Dr. Hoffman.

204f,w. Ocular Muscles. 24 hours per quarter. 2 cred. per quarter. Dr. Grant.

205w. Perimetry. 12 hours. 1 cred. Dr. Hoffman.

206f,w,s. Surgery of the Eye. 55 hours per quarter. 5 cred. per quarter. Dr. Hansen and staff.

207w. Pathology of the Eye. 22 hours. 2 cred. Dr. Camp, Dr. Walsh.

208f. Ophthalmoscopy. 22 hours. 2 cred. Dr. Schwartz, Dr. Edwards.

209s. Neuro-ophthalmoscopy. 12 hours. 1 cred. Dr. Stanford.

210s. Animal Surgery. 22 hours. 2 cred. Dr. Hansen.

211w,s. Physiology of Vision and Physiologic Optics. 11 hours. 1 cred. per quarter. Dr. Pfunder.

212w,s. Seminar in Ophthalmology. 12 hours. 1 cred. Dr. Hansen and staff.

213s. Review of Texts on External Diseases. Dr. Stanford.

214f. Histology of the Eye. 22 hours. 2 cred. Dr. Camp, Dr. Walsh.

215w. Radiology of the Eye, Orbit, and of the Head. Dr. Rigler and staff.

216s. Plastic Surgery of the Eye and Adnexa. Dr. Leven.

217w. Allergy of the Eye. Dr. Hansen.
218s. Ophthalmic Therapeutics. Dr. Hansen and staff.
219s. History of Ophthalmology. Dr. Hoffman.

B. Courses Offered in the Mayo Foundation

Professor William L. Benedict, M.D.; Associate Professors Avery D. Prangen, M.D., C. Wilbur Rucker, M.D., M.S. in Ophth., Henry P. Wagener, M.D., M.S. in Ophth.; Assistant Professor Hugo L. Bair, M.D.

Practical experience in diagnosis and treatment of diseases of the eye is available to fellows majoring in ophthalmology. Included also are studies in the basic sciences underlying the field and the practical application of those principles to the clinical conditions.

COURSES

M270f,w,s,su. Pathology of the Eye. Dr. Kernohan, Dr. Parkhill.
M271f,w,s,su. Refraction and Ophthalmic Myology. Theory of refraction, retinoscopy, diagnosis of refractive errors of the eye, prescribing of lenses, practical work on patients under supervision of instructor. Eye movements, disturbances of motility of the eyes. Dr. Prangen.
M272f,w,s,su. Clinical Ophthalmology. External diseases of the eye, ophthalmoscopy, ophthalmic surgery. Dr. Benedict, Dr. Bair.
M273f,w,s,su. Medical Ophthalmoscopy. Ophthalmology in relation to general diseases. Dr. Rucker, Dr. Wagener, Dr. Bair.
M274f,w,s,su. Neuro-ophthalmology. Ophthalmology in relation to diseases of the nervous system. Physiology of the eye, psychology of vision, functional eye disturbances. Dr. Rucker, Dr. Wagener.

In addition to the above, students majoring in ophthalmology may take work in biophysics, ophthalmic pathology, or physiologic optics. For details, see these departments.

Otolaryngology

A. Courses Offered at the Medical School

Clinical Professors Lawrence R. Boies, M.A., M.D., Director, Anderson C. Hilding, Ph.D., M.D.; Clinical Associate Professors Charles E. Connor, M.A., M.D., Kenneth A. Phelps, M.D.; Assistant Professors Henry V. Hansen, M.D., Jerome J. Hilger, M.D., M.S., John J. Hochfilzer, M.D., Robert E. Priest, M.D., M.S., Instructor George M. Tangen, M.D., M.S.; Clinical Instructor Leander T. Simmons, M.D.

COURSES

101f. Otology. Lect. and demonstrations. Senior medical students. 1 cred. Dr. Boies and staff.
102f. Rhinology. Lect. and demonstrations. Senior medical students. 1 cred. Dr. Boies and staff.
103f. Laryngology. Lect. and demonstrations. Senior medical students. 1 cred. Dr. Boies and staff.
104f,w,s,su. Clinic in Diseases of the Ear. Diagnosis and treatment of cases. Part of section clinics, surgical clerkship period. 2 cred. University Dispensary. Staff.
105f,w,s,su. Clinic in Diseases of the Nose and Throat. Diagnosis and treatment of cases. Part of section clinics, surgical clerkship period. 2 cred. University Dispensary. Staff.
230f-w-s-su. Clinical Otology. 4 cred. per quarter. Staff.
231f-w-s-su. Clinical Rhinology and Laryngology. 4 cred. per quarter. Staff.
232f-w-s-su. Surgery of the Ear, Nose, and Throat. Operative clinic in the University Hospitals. 1 cred. per quarter. Staff.

233f-w. Operative Surgery of the Temporal Bone. 2 cred.
234f-w. Operative Surgery of the Nose and Throat. 2 cred.
235s. Roentgenology of the Head. ½ cred. Dr. Rigler, Dr. Peterson.
236w. Functional Ear Tests, 1 cred. Staff.
237f. Endoscopy. Lect. and demonstrations. 2 cred.
238f. Pathology of the Ear, Nose, and Throat. 2 cred. Staff.
239s. Endocranial Complications of Ear Diseases. 1 cred. Staff.
240s. Physiotherapy and Surgery of the Malignant Diseases of the Ear, Nose, and Throat. ½ cred. Dr. Stenstrom and staff in Otolaryngology.
241f,w,s. Seminar in Otolaryngology. 1 cred. Staff.
242f. Diseases of the Labyrinth. 1 cred. Staff.
247w. Plastic Surgery of the Nose. 1 cred. Staff.

Otolaryngology and Rhinology

B. Courses Offered in the Mayo Foundation

Professor Harold I. Lillie, M.D.; Associate Professors Bert E. Hempstead, M.D., Henry L. Williams, M.D., M.S. in Otolaryngology; Assistant Professor Kinsey M. Simonton, M.D., M.S. in Otolaryngology; Instructor Olav E. Hallberg, M.D., M.S. in Otolaryngology.

Practical experience in diagnosis and treatment of diseases of the ear, nose, and throat is available to fellows majoring in otolaryngology and rhinology. Included also are studies in the basic sciences underlying the field and the practical application of those principles to the clinical conditions.

COURSES

M275f,w,s,su. Clinical Otolaryngology and Rhinology. Theory and practice with differential diagnosis of diseases of the ear, nose, accessory sinuses, pharynx, and larynx, and their relation to general diagnosis. Dr. Lillie, Dr. Hempstead, Dr. Williams, Dr. Simonton, Dr. Hallberg.
M276f,w,s,su. Preoperative and Postoperative Care of Patients. Treatment of complications. Dr. Lillie, Dr. Hempstead, Dr. Williams, Dr. Simonton, Dr. Hallberg.
M277f,w,s,su. Operative Otolaryngology and Rhinology. Hospital residence, second assistantship in operating service. Dr. Lillie, Dr. Hempstead, Dr. Williams, Dr. Simonton, Dr. Hallberg.
M278f,w,s,su. Operative Otolaryngology and Rhinology. First assistantship in operative service. Dr. Lillie, Dr. Hempstead, Dr. Williams, Dr. Simonton, Dr. Hallberg.

In addition to the above, fellows majoring in otolaryngology and rhinology may take work in anatomy, bacteriology, biophysics, or surgical pathology. For details, see these departments.

Plastic Surgery

(Including Maxillofacial and Laryngological Surgery)

B. Courses Offered in the Mayo Foundation

Professor Gordon B. New, D.D.S., M.D.; Associate Professors Frederick A. Figi, M.D., Fred Z. Havens, M.D.; Assistant Professor John B. Erich, M.D., D.D.S., M.S. in Oral Surg.

The fellowship in plastic surgery and related subjects is designed to prepare selected men for the practice of this specialty, and to develop investigative interest in this subject.

COURSES

M279f,w,s,su. Observation of Plastic Procedures As Related to Orthopedic, Urological, and Gynecological Surgery. An opportunity during this period will be given fellows to take surgical pathology for credit as a minor subject. Dr. New.

M280f,w,s,su. Diagnostic and Operative Service. Plastic surgery of the face and neck (preoperative, operative, and postoperative treatment). Diagnosis and operative treatment of neoplasms of the head and neck. Dr. New, Dr. Figi, Dr. Havens, Dr. Erich.

M281f,w,s,su. Hospital Residence. Operative plastic surgery of the face and neck. Immediate and late care of maxillofacial injuries. Operative and other treatment of neoplasms of the head and neck. Dr. New, Dr. Figi, Dr. Havens, Dr. Erich.

M282f,w,s,su. Operative Plastic, Maxillofacial, and Laryngological Surgery. First assistantship in operative service. Dr. New, Dr. Figi, Dr. Havens, Dr. Erich.

PATHOLOGY

A. Courses Offered at the Medical School

Professors Elexious T. Bell, M.D., Head, Benjamin J. Clawson, M.D., Ph.D.; Associate Professors Nathaniel H. Lufkin, M.D., James S. McCartney, Jr., M.D., John F. Noble, M.D.; Assistant Professors Robert Hebbel, M.D., Ph.D., Ambrose J. Hertzog, M.D., Ph.D.

Prerequisites—Graduate students who desire to take their major work in pathology must present credits for the equivalent of the first two years' work of the Medical School of this University. A degree with designation, such as M.S. in Pathology, is awarded only to those who have an M.D. degree.

Master's degree—Work for the Master's degree is offered only under Plan A.

Master's degree with designation in pathology—This degree is given only after three years of work.

Doctor's degree—The Ph.D. degree with designation in pathology may be awarded after the completion of three or more years of graduate work and the presentation of a thesis of high quality.

NOTE—For information on work in Cancer Biology, see pages 19 and 20.

COURSES

104f,w,s,su. Autopsies. The average number of post-mortems available is about 2,500 per year. Graduate students take part in post-mortems, prepare post-mortem records, and make microscopic examinations of various organs and tissues. The student may attend as many post-mortems as his other work allows. Prereq.: Courses 101, 102. Cred. ar. Staff.

107f. Diagnosis of Tumors. Prereq.: Courses 101, 102. 2 to 5 cred. Dr. McCartney.

107af,w,s. Surgical Pathology. Prereq.: Courses 101, 102. 2 to 5 cred. Dr. Hebbel.

107bw. Diseases of the Heart. Prereq.: Courses 101, 102. 2½ cred. Dr. Clawson.

107cs. Diseases of the Kidney. Prereq.: Courses 101, 102. 2½ cred. Dr. Bell.

109f,w,s,su. Clinical Pathologic Conference. The students are provided one week in advance with the clinical history of a case. The case is fully discussed clinically. The students are expected, in so far as possible, to predict the post-mortem findings from the clinical data. A full post-mortem report is then given. One hour per week. Prereq.: Courses 101, 102. 1 cred. Dr. Bell.

110f,w,s. Seminar in Pathology. Prereq.: Course 102. Dr. Bell.

111su,f,w,s. Conference on Autopsies. Prereq.: Course 102. Dr. Bell and staff.

201f,w,s,su. Research. Graduate students with the necessary preliminary training may elect research, either as majors or minors in pathology. Hours and cred. ar. Staff.

B. Courses Offered in the Mayo Foundation

Professors A. Compton Broders, M.D., M.S. in Path., D.Sc., William H. Feldman, D.V.M., M.S., James W. Kernohan, M.B., B.Ch., D.P.H., M.A., M.D., William C. MacCarty, M.S., M.D., Thomas B. Magath, M.D., Ph.D., Frank C. Mann, M.D., M.A., D.Sc., Arthur H. Sanford, M.A., M.D., Carl F. Schlotthauer, D.V.M.; Associate Professor John R. McDonald, M.D., M.S. in Path.; Assistant Professors Archie H. Baggenstoss, M.D., M.S. in Path., Malcolm B. Dockerty, M.D.C.M., M.S. in Path., Jesse E. Edwards, M.D., Donald R. Mathieson, M.S., M.D., Edith M. Parkhill, M.D., M.S. in Path.; Instructors Alfred G. Karlson, D.V.M., Ph.D., George P. Sayre, M.D., M.S. in Path.

Opportunities for advanced work in pathology are offered in four different sections in the Mayo Foundation, as follows:

Clinical Pathology—Work in this section includes diagnostic work in the laboratories of gastrology, urinalysis, serology, bacteriology, parasitology, and clinical chemistry. Graduate students in these clinical laboratories may learn the technique of accepted diagnostic procedure. Special attention is called to the opportunity for experience and research in serology under the direction of Dr. Sanford, and for training and research in parasitology under the direction of Dr. Magath. This work may be taken either as a major or as fulfilling the conditions of a minor.

Pathologic Anatomy—Post-mortem examinations are made in sufficient numbers to permit approximately ten fellows being assigned to the section.

The service is designed to permit the laying of a thoro foundation in the general principles of pathologic anatomy. Each fellow serves as junior assistant three months and senior assistant three months, during which time he takes part in the routine of post-mortem examinations and studies the microscopic sections of these post-mortems and engages in weekly conferences and seminars concerned with general and special subjects in pathologic anatomy. Each fellow is expected to take up some special line of work upon which he reports to the group. Microscopic and gross demonstrations are held at frequent intervals, and the work throughout is intimately supervised. Collateral reading and study are encouraged, and often the foundation may be laid for thesis studies or special lines of research. There is available for study a large collection of operative and post-mortem specimens, both gross and microscopic, cross-indexed as to organ and disease. In addition there are over 10,000 photographs of gross specimens illustrating various phases of pathologic anatomy.

Surgical Pathology—The laboratories of surgical pathology receive immediately all tissue removed at operation. It is studied both grossly and microscopically. The minimum residence in this service is six months, during which time opportunity is given to study a large amount of operative material in conjunction with clinical histories. Besides the routine diagnostic experience fellows are expected to begin to carry along in these laboratories some piece of pathologic research.

Experimental Pathology and Comparative Pathology—Work in this section consists of research in problems of pathology involving the use of animals for experiment. Seminars arranged for fellows in pathology are held regularly.

COURSES

M283f,w,s,su. Clinical Pathology. Making and examining of cultures, preparation and administration of autogenous vaccines, Wassermann tests, special clinical and laboratory methods including hematology and serology and opportunity for research. Dr. Magath, Dr. Sanford, Dr. Mathieson.

M284f,w,s,su. Parasitology. Routine clinical and special research in parasitology, examination of stools, study of internal parasites. Dr. Magath.

M285f,w,s,su. Clinical Hematology. Dr. Sanford, Dr. Heck, Dr. Watkins.

M286f-w,w-s,s-su,su-f. Necropsy Service. Junior assistant three months; senior assistant three months; demonstrations in clinico-pathologic conferences; microscopic examination of fixed tissues removed at necropsy. Bacteriology and necropsy material. Research problems. Weekly seminars. Dr. Kernohan, Dr. Baggenstoss, Dr. Edwards, Dr. Sayre.

M287f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. The diagnosis of surgical specimens (gross and microscopic) with immediate correlation with all clinical data. Bacteriology of surgical material. Research problems. Daily demonstrations and discussions. Dr. Broders, Dr. MacCarty, Dr. McDonald, Dr. Dockerty, Dr. Parkhill.

M288f,w,s,su. Research Work on Selected Problems in Experimental Pathology. Dr. Mann, Dr. Bollman.

M289f,w,s,su. Research Work on Selected Problems in Comparative Pathology. Dr. Feldman, Dr. Schlotthauer, Dr. Karlson.

In addition to the above, students majoring in pathology may do research work in biophysics, physiological chemistry, experimental physiology, and bacteriology. For details, see these departments.

PEDIATRICS

The graduate work of the Department of Pediatrics is arranged with the intention (a) of preparing students to become competent pediatricians, (b) of training them in the technics of clinical investigation, and (c) of making them competent teachers in the subject.

A. Courses Offered at the Medical School

Professor Irvine McQuarrie, M.D., Ph.D., Head, Bryng Bryngelson, Ph.D.; Clinical Professors Edgar J. Huenekens, M.D., M.A., Erling S. Platou, M.D., Frederick C. Rodda, M.D., Max Seham, M.D.; Associate Professors John M. Adams, M.D., Ph.D., Paul F. Dwan, M.D., Reynold A. Jensen, M.D.; Clinical Associate Professors Hyman S. Lippman, M.D., Ph.D., Lawrence F. Richdorf, M.D., Ph.D., Albert V. Stoesser, M.D., Ph.D., Robert L. Wilder, M.D.; Assistant Professors Mildred R. Ziegler, Ph.D., Marguerite Booth, M.D., M.S.

The work of the department is conducted in the pediatric research laboratories, the wards, and the Out-Patient Department of the University Hospitals, at the Minneapolis General Hospital, Northwestern Hospital and St. Barnabas Hospital, both in Minneapolis, and St. Paul Children's Hospital in St. Paul. The infant and child welfare organizations and the child guidance clinics of Minneapolis and St. Paul afford additional opportunities for all phases of preventive pediatrics.

The general library of the University with almost complete files of journals dealing with pediatrics and allied fields furnishes adequate reference facilities.

Research laboratories attached to the Department of Pediatrics and the large general laboratories attached to the Departments of Anatomy, Bacteriology, Pathology, Pharmacology, Physical Medicine, Biochemistry, and Physiology are at the disposal of graduate students, and afford every possible opportunity for research.

Prerequisites—A general understanding of bacteriology, immunology, pathology, physiology, and physiological chemistry, and a reading knowledge of certain foreign languages are essential.

Minor—Students are required to carry a minor in one of the fundamental branches or allied fields.

Master's and Doctor's degree—Courses leading to higher degrees can be arranged by consultation with members of the graduate teaching faculty.

COURSES§

150f,w,s.¶ Physiology and Diseases of the Newborn. Dr. Adams, Dr. Stoesser, Dr. Bosma.

152f,w,s.¶ Fundamental Principles of Nutrition and Metabolism As Applied to Children. Seminar course. Dr. McQuarrie, Dr. Ziegler.

§ Time and credit to be arranged with Dr. McQuarrie.
¶ Not offered to fewer than 10 students.

154f,w,s.¶ Endocrinology as Applied to Pediatrics. Seminar course. Dr. McQuarrie.

156f,w,s.¶ Advanced Study of Noncontagious Diseases of Childhood. Both clinical and experimental subject matter included. Dr. McQuarrie, Dr. Adams, Dr. Huenekens.

158f,w,s.¶ Advanced Study of Contagious Diseases. Dr. Stoesser, Dr. Platou, Dr. Seham, Dr. Bosma.

160f,w,s. Allergic Disorders in Childhood. Dr. Stoesser.

162f,w,s. Pediatric Psychiatry. Special emphasis is placed on the psychosomatic aspects of pediatrics and on the recognition and management of the common behavior disturbances of childhood. Speech disturbances, reading disabilities, and mental retardation are considered. Dr. Jensen, Dr. Lippman, Dr. Harold Hanson.

163f,w,s. Hematology of Infancy and Childhood. Dr. Booth, Dr. E. N. Nelson.

164f,w,s.¶ Rare and Unusual Diseases of Infancy and Childhood. Seminar course. Dr. McQuarrie, Dr. Rodda.

166f,w,s. Weekly Seminar for Detailed Discussion of Fundamental Subjects Related to Pediatrics. Dr. Ziegler.

167f,w,s. Weekly Seminar for Review of Current Literature. Dr. Booth.

168f,w,s. Speech Disturbances in Childhood. Clinic course. Dr. Bryng Bryngelson, Dr. Jensen, Mr. Stenswick, Miss Arkola.

170f,w,s. Rheumatic Infection and Heart Diseases in Childhood. Dr. Adams, Dr. Seham, Dr. Schapiro, Dr. Dwan.

202f,w,s,su. Pediatric Clinic. Out-patient Department, University Hospitals and Minneapolis General Hospital. Daily, 9:00-12:00. Dr. McQuarrie, Dr. Adams, Dr. Grulee, Dr. Stoesser, Dr. Bosma.

204f,w,s,su. Residency in Pediatrics. Consists of advanced clinical training in all aspects of pediatric practice with systematic rotation through the various subdivisions of the in-patient and out-patient clinics at the University Hospitals, the Minneapolis General Hospital, Northwestern Hospital, St. Barnabas Hospital, and St. Paul Children's Hospital. Dr. McQuarrie, Dr. Huenekens, Dr. Platou, Dr. Richdorf, Dr. Seham, Dr. Adams, Dr. Grulee, Dr. Hedenstrom, Dr. Jensen, Dr. Stoesser, Dr. Bosma, and staffs.

208f,w,s,su. Pediatric Research. Special problems in various subdivisions of the pediatric field may be selected for study. Students may collaborate with members of the staff or with other students where suitable arrangements can be made. Dr. McQuarrie, Dr. Adams, Dr. Jensen, Dr. Stoesser, Dr. Ziegler, and staff.

B. Courses Offered in the Mayo Foundation

Professors Henry F. Helmholz, M.D.; C. Anderson Aldrich, M.D.; Associate Professors Haddow M. Keith, M.B., Roger L. J. Kennedy, M.D., M.S. in Ped.; Assistant Professor George B. Logan, M.D., M.S. in Ped.

The opportunities offered in pediatrics in the Mayo Foundation are designed for the purpose of training a few selected physicians for the special practice of pediatrics. The courses are also valuable to fellows majoring in special clinical fields, for example, in internal medicine.

The work of the department comprises:

a. The Rochester Child Health Project, functioning as a part of the section on Pediatrics, is engaged in a preventive program in the City of Rochester, co-operating with St. Mary's Hospital, the City Health Department, Public Health Nurses, Nursery Schools, and the Public Schools. Six months of the pediatric fellowship are usually spent in this department which includes training in the care of the newborn, well-baby services and health supervision of preschool and school age children. Two or three fellows are assigned to this service.

¶ Not offered to fewer than 10 students.

b. A special advantage lies in the large number of cases presenting unusual manifestations of common diseases, as well as those conditions which are not so frequently seen in the ordinary hospital and out-patient departments.

c. The work in the city affords a chance for routine practice in pediatrics, including the usual infectious diseases.

d. The department has a hospital service of its own. In addition it has the supervision of all children below the age of fourteen years in the other hospitals. The Department of Pediatrics co-operates with the surgical sections in the preoperative and postoperative management of the patient.

e. Six months are usually spent in Minneapolis, in the Department of Pathology of the Medical School, working in gross pathologic anatomy.

f. Research is regarded as an important feature of the graduate work, and there are ample laboratory and clinical facilities for investigative study.

COURSES

M290f-w,w-s,s-su,su-f. Preventive Pediatrics. Limited to two fellows. Dr. Helmholz. Dr. Aldrich.

M291f-w,w-s,s-su,su-f. Diagnosis of Medical and Surgical Diseases of Infancy and Childhood. Research. Seminar. Dr. Helmholz, Dr. Keith, Dr. Kennedy, Dr. Logan.

M292f-w,w-s,s-su,su-f. Pediatrics. Hospital residence. Research. Seminar. Dr. Helmholz, Dr. Keith, Dr. Kennedy, Dr. Logan.

104f,w,s,su. Pathology. Autopsies. Dr. Bell. (See Pathology 104.)

In addition to the above, fellows in pediatrics may take work in physiological chemistry and experimental physiology. For details, see these departments.

PHARMACEUTICAL CHEMISTRY

Courses Offered in the College of Pharmacy

Professors Charles H. Rogers, D.Sc., Ole Gisvold, Ph.D., Charles V. Netz, Ph.D.; Charles O. Wilson, Jr., Ph.D.; Associate Professors Willard J. Hadley, Ph.D., Taito Soine, Ph.D.

Prerequisites—Graduate work leading to the M.S. and Ph.D. degrees with a major in pharmaceutical chemistry is open to those students who have shown exceptional scholarship and ability in the undergraduate course of this or some other college of pharmacy of equal standing. Consideration will be given to the applications of those students who are not graduates in pharmacy but whose pattern of undergraduate work includes training in such allied or related subjects as would implement them to pursue work successfully at the graduate level with a major in pharmaceutical chemistry.

Language requirement—The language requirement of the Graduate School must be met. In exceptional cases a substitution is permitted by petition.

Master's degree—In general, work leading to the master of science degree is offered under Plan A. In exceptional cases, Plan B may be offered by petition.

Doctor's degree—Graduate work leading to the Ph.D. degree is offered to students properly prepared for advanced work in pharmaceutical chemistry.

COURSES

161f-162w-163s. Organic Pharmaceutical Products. This course treats of the sources, methods of production, properties, reactions, relationships of structures to activity, and uses of the natural and synthetic organic compounds used as therapeutic agents. Prereq.: Org. Chem. 2. 3 cred. per quarter. Dr. Gisvold.

161f deals with hydrocarbons, halogenated hydrocarbons, alcohols, aldehydes, ketones, acids, phenols, ethers, and esters.

162w considers analgesics, organometallics, e.g., mercurials, silver compounds, arsenicals, bismuth compounds, dyes, surface active agents, miscellaneous antiseptic agents, sulfonamides, and antibiotics.

163s treats of pressor principles, myotics, mydriatics, antispasmodics, local anesthetics, barbiturates and related compounds, alkaloids, tannins, cardiac glycosides, sex hormones and structurally related compounds and vitamins.

164w-165s. Special Analytical Methods. A study of the special analytical methods, both physical and chemical, employed in the analyses of some drugs and foods. The viscosimeter, Abbe and Zeiss refractometers, polariscope, Duboscq colorimeter, cryoscope, and other special instruments are used in the laboratory for quantitative measurements. Prereq.: Org. Chem. 2, Pharm. Chem. 54f for 164w, and Pharm. Chem. 55w for 165s. 3 cred. per quarter. Dr. Soine, Dr. Wilson.

201f,w,s.* Pharmaceutical Chemistry Seminar. Required of all students majoring in pharmaceutical chemistry and pharmacognosy. 1 cred. per quarter. Dr. Gisvold.

202f-203w-204s.* Advanced Analytical Methods. The analyses of complex food, drug, and cosmetic products. Identification of colors, perfumes, flavoring agents, digestants, adulterants, etc. Special precision instruments. Prereq.: Course 165. 3 to 5 cred. per quarter. Dr. Rogers, Dr. Netz.

205f-206w-207s.* Chemistry of Medicinal Products. A study of the chemistry and of the relationships between constitution and physiologic action of organic compounds. Isolation of active principles and syntheses of medicinal compounds. Prereq.: Organ. Chem. 2 and Course 163 or permission of instructor. 3 to 6 cred. per quarter.

205f considers proteins, enzymes, co-enzymes, respiratory enzymes, biological oxidation and reductions, vitamins, some hormones, and the cardiac glycosides. Dr. Gisvold.

206w treats of organo-metallics (i.e., mercurials, arsenicals, and bismuth compounds), certain dyes, acridines, sulfones, sulfonamides, amidines, and the complex ureas. Dr. Gisvold.

207s considers central nervous system depressants, central nervous system stimulants, analgesics, local anesthetics, parasympathomimetics, sympathomimetics, and spasmolytics. Dr. Wilson.

208f. Carbohydrates and Glycosides. A consideration of the origin, isolation, characterization, and chemistry of the carbohydrates and glycosides. Prereq.: Course 163, or permission of the instructor. 3 to 5 cred. Dr. Gisvold.

209f.* Alkaloids. A discussion of the chemistry and experiments on the methods used to isolate, purify, and characterize the alkaloids. Preq.: Course 163, or permission of instructor. 3 to 5 cred. Dr. Soine.

210f.* History of Pharmaceutical Chemistry. 3 cred. Dr. Netz.

211w.* Terpenes, Carotinoids, Tannins, and Anthocyanins. A discussion of the chemistry and an experimental investigation of the methods of isolation and characterization of the volatile oils and their constitutents. Prereq.: Course 163, or permission of instructor. 3 to 5 cred. Dr. Wilson.

212s.* Fats, Waxes, Sterols, and Related Compounds. A consideration of the origin, isolation, characterization, and chemistry of the fats, waxes, sterols, and related compounds. Prereq.: Course 163, or permission of instructor. 3 to 5 cred. Dr. Gisvold.

213f,w,s,su. Special Problems. A study and experimental investigation of one or more topics, e.g., complex drug and cosmetic products, carotinoids, enzymes, fats, oleoresins, pigments, proteins, resins, vitamins, waxes, etc. Prereq.: Course 163, or permission of instructor. Cred. ar. Dr. Rogers, Dr. Gisvold, Dr. Hadley, Dr. Netz, Dr. Soine, Dr. Wilson.

214f,w,s,su. Research in Pharmaceutical Chemistry. Cred. ar. Dr. Rogers, Dr. Gisvold, Dr. Hadley, Dr. Netz, Dr. Soine, Dr. Wilson.

PHARMACOGNOSY

Courses Offered in the College of Pharmacy

Professors Earl B. Fischer, Ph.D., Charles H. Rogers, D.Sc.

Prerequisites—Graduate work leading to the M.S. and Ph.D. degrees with a major in pharmacognosy is open to those students who have shown exceptional scholarship and ability in the undergraduate course of this or some other college of pharmacy of equal standing. Consideration will be given to the applications of those students who are not graduates in pharmacy but whose pattern of undergraduate work includes training in such allied or related subjects as would implement them to pursue work successfully at the graduate level with a major in pharmacognosy.

Language requirement—The language requirements of the Graduate School must be met. In exceptional cases a substitution is permitted by petition.

Master's degree—In general, work leading to the master of science degree is offered under Plan A. In exceptional cases, Plan B may be offered by petition.

Doctor's degree—Graduate work leading to the Ph.D. degree is offered to students properly prepared for advanced work in pharmacognosy.

COURSES

162w‡-163s.‡ Biological Assay of Drugs. This course includes didactic and laboratory considerations of the biological assays of the vegetable and animal drugs of the United States Pharmacopoeia and National Formulary. Important nonofficial assay methods are also studied. Registration in this course is limited to available instructional facilities. Prereq.: Course 57 and Pharm. Chem. 56. 6 cred. Dr. Fischer.

201f.* Advanced Pharmacognosy. A study of the important constituents of vegetable and animal drugs. Laboratory work includes the microscopic study of cell contents as they occur in those drugs, and their isolation and identification by microscopical and microchemical means. Constituents studied include alkaloids, calcium carbonate, calcium oxalate, carbohydrates, fixed oils, glycosides, mucilages and gums, oleoresins, resins, silica, tannins, volatile oils, etc. Prereq.: Courses 55, 56, 57. 3 to 5 cred. Dr. Fischer.

202w.* Advanced Pharmacognosy. A lecture and laboratory course dealing with microscopic characteristics, structure, and function of the various cell forms found in vegetable and animal drugs and the tissues which they constitute. Important microscopical accessories such as the micropolariscope, microphotographic camera, staining reagents, etc., are used in this work. Prereq.: Courses 55, 56, 57. 3 to 5 cred. Dr. Fischer.

203s.* Advanced Pharmacognosy. A systematic study of the pharmacognosy and pharmacohistology of the official, and a few important nonofficial, vegetable and animal drugs. Information concerning the microscopic and microchemical properties of cell contents and cell forms and the arrangement of the latter in the plant is applied to the identification, determination of purity, evaluation, and detection of the adulteration of these drugs. Prereq.: Courses 55, 56, 57. 3 to 5 cred. Dr. Fischer.

204f,w,s,su. Research in Pharmacognosy. Cred. ar. Dr. Fischer, Dr. Rogers.

205f. Microscopy of Foods. The identification of food products of vegetable origin, by means of the microscopic structure and microchemical reactions of their tissues and cell-contents, together with the determination of purity and the detection of adulteration. Prereq.: Courses 55, 56, 57. 3 to 5 cred. Dr. Fischer, Dr. Rogers.

‡ A fee of $5 per quarter is charged for this course.

206w. Technical Microscopy. A study of the microscopic characteristics and the identification of technical products such as vegetable and animal fibers, woods, barks, cellulose, texiles, seeds, etc. Prereq.: Courses 55, 56, 57. 3 to 5 cred. Dr. Fischer, Dr. Rogers.

NOTE—All students majoring in Pharmacognosy are required to take Pharm. Chem. 201, Pharmaceutical Chemistry Seminar.

PHARMACOLOGY

A. Courses Offered at the Medical School

Professor Raymond N. Bieter, M.D., Ph.D.; Associate Professor Harold N. G. Wright, Ph.D.

The laboratories of the Department of Pharmacology are excellently equipped for the study of both the chemical properties of drugs and their actions upon the functions of the living organs and tissues, for studies upon the detection, isolation, and estimation of poisons, and for experimental chemotherapy. By the co-operation of the clinical departments, special studies may be made of the action of drugs, old and new, upon patients in the University Hospitals and allied hospitals.

Opportunities are afforded for the special study of the actions of drugs which are used in each of the clinical specialties and the literature bearing upon them. As the needs of each graduate student are individual in this regard, these studies are taken up by conference, seminar, and experiments specially devised to meet each case.

Prerequisites—In addition to fulfilling the usual requirements for admission to the Graduate School including a Bachelor's degree, students should satisfy the requirements for entrance to the Medical School.

Minor—This department offers work for a minor to students in allied sciences.

Master's degree—Work for the Master's degree is offered under Plan A.

Doctor's degree—Work toward the Ph.D. degree is offered in this department.

COURSES

101f,w,su. Introduction to Pharmacology. The principles underlying the structure, physiochemical properties, physiologic, therapeutic, and toxic action of substances, natural or synthetic, used as medicines. Prereq.: at least one quarter of physiology. 2 cred. Dr. Bieter, Dr. Wright.

102w,s,su. General Pharmacology. A study of the most important drugs used in medicine with consideration of their chemical properties, actions on the normal and abnormal body, modes of administration, preparation, dosages, etc. Prereq.: at least one quarter of physiology. 6 cred. Dr. Bieter, Dr. Wright.

103f,s,su. General Pharmacology, in continuation. Lectures on narcotic, soporific, analgesic, antipyretic drugs. Remedies used for the treatment of arthritides, etc. Writing of prescriptions for the drugs used. 1 cred. Dr. Bieter, Dr. Wright.

104f,s,su. General Pharmacology, in continuation. Lectures on the salts of the metals, antiseptics, antisyphilitic drugs, chemotherapy, etc. 1 cred. Dr. Bieter, Dr. Wright.

108f,s,su. Prescription Writing. The principles of prescription writing. 1 cred. Dr. Wright.

109f,w,s,su. Pharmacological Problems. Special investigations and experimental study of one or more of the following topics: anesthetics; circulatory stimulants and depressants; drugs acting upon the kidneys; chemotherapeutic drugs; antiseptics; urinary antiseptics; poisons and antidotes; effects of common drugs; internal secretions; action of drugs upon parasites, tumors, etc. Hours and cred. ar. Dr. Bieter, Dr. Wright.

110f,w,s,su. Poisons. Their detection, actions, and antidotes. 2 cred. Dr. Wright.

111f,w,su. Advanced Toxicology. Quantitative toxicological analysis. Hours and cred. ar. Dr. Wright.

123f,w,s,su. Special Topics in Pharmacology. Hours ar. 2 cred. Dr. Bieter, Dr. Wright.

203su,f,w,s. Research in Pharmacology. Hours and cred. ar. Dr. Bieter, Dr. Wright.

204f,w,s. Advanced Pharmacology. With collateral readings. Limited to six advanced students. Hours ar. 1 cred. Staff.

205f,w,s. General Discussions in Pharmacology. With collateral readings. Hours and cred. ar. Dr. Bieter, Dr. Wright.

B. Courses Offered in the Mayo Foundation

All opportunities for advanced work in pharmacology and therapeutics offered in the Mayo Foundation are in connection with the Departments of Medicine, Pediatrics, and Surgery. For details, see announcements of these departments.

PHYSICAL MEDICINE

A. Courses Offered at the Medical School

Clinical Assistant Professor Miland E. Knapp, M.D.; Clinical Instructor Donald J. Erickson, M.D.

The field of physical medicine, which includes physical therapy, occupational therapy, and rehabilitation, is, at the present time, one of the most rapidly expanding specialties in medicine. Trained physiatrists, of whom there is an insufficient number, are greatly needed to supply openings in medical schools, private practice, and the veteran's administration. Physical medicine therefore offers unusual opportunity to the enterprising young physician who is interested in developing a new medical specialty.

Opportunity for clinical and fundamental research as well as excellent clinical experience and training is offered at the University of Minnesota.

COURSES

103f,w,s,su. Physical Therapy Clinic. Opportunity to participate in practical application of physical therapy to patient. Hours and cred. ar. Dr. Knapp.

200f,w,s,su. Physical Medicine. Service at University Hospitals, Minneapolis General Hospital, and other affiliated hospitals. Hours and cred. ar. Dr. Knapp, Dr. Erickson.

210f,w,s,su. Research in Physical Medicine. Research problems in physical medicine. Hours and cred. ar. Dr. Knapp.

220f,w,s,su. Seminar in Physical Medicine. Discussion of various problems related to physical medicine. Hours and cred. ar. Dr. Knapp.

B. Courses Offered in the Mayo Foundation

Professor Frank H. Krusen, M.D.; Instructor Howard F. Polley, M.D., M.S. in Med.

At present there is great need for well-trained medical men in the field of physical medicine. Hospitals and teaching institutions have sent a number of requests to the foundation for men with such training.

Clinical training is provided in the three departments of physical medicine. Ample opportunity for clinical research is available. Instruction in electrotherapy, fever therapy, hydrotherapy, light therapy, mechanotherapy, thermotherapy, and physical rehabilitation of the disabled is provided. The employment of physical agents in the various fields of medicine, particularly in relation to the treatment of arthritis, orthopedic surgery, vascular diseases, and various other medical and surgical specialties, is stressed. The physician who completes this fellowship should be well prepared in all details of the conduct of a depart-

ment of physical medicine of a hospital and should be capable of teaching this subject in a medical school. Special seminars in didactic phases of physical medicine are offered. Opportunities in related fields may be arranged.

COURSES

M266f,w,s,su. Physical Medicine. Dr. Krusen, Dr. Polley.

M267f,w,s,su. Special service in physical medicine as related to orthopedic surgery. Dr. Krusen, Dr. Polley.

M268f,w,s,su. Fever Therapy. Open to fellows majoring in gynecology, medicine, physical medicine, or urology. Dr. Krusen, Dr. Polley.

In addition to the above, fellows majoring in physical medicine may take work in biophysics, experimental physiology, radium, and Roentgen therapy. For details, see these departments.

PHYSIOLOGY

A. Courses Offered at the Medical School

Professors Maurice B. Visscher, M.D., Ph.D., Head, Ernst Gellhorn, M.D., Ph.D., K. Wilhelm Stenstrom, Ph.D., Herbert S. Wells, M.D.; Associate Professors Allan Hemingway, Ph.D., Joseph T. King, M.D., Ph.D., Nathan Lifson, M.D., Ph.D.; Assistant Professor Roger M. Reinecke, M.D., Ph.D

Prerequisites—For a major or minor in physiology, acceptable courses in general zoology or anatomy, general chemistry, organic chemistry, and college physics are prerequisites. Physical chemistry is desirable.

Language requirement—A reading knowledge of German, French, Russian, or Spanish is required of candidates for the Master's degree in this department, and a reading knowledge of French and German of candidates for the Doctor's degree unless substitution is permitted upon the student's petition.

Minor—Students majoring in clinical subjects who desire a minor in physiology must have had the courses in these branches usually required of medical students.

Master's degree—Work for the master of science degree is offered under both Plan A and Plan B, the latter only by petition.

Doctor's degree—Work for the Ph.D. degree is offered to candidates whose background of training is approved by the Department.

COURSES

103f. Physiology of Muscle, Circulation, Respiration, Digestion, Metabolism, and Nutrition. Prereq.: organic chemistry and zoology. 9 cred. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

104w. Physiology of Excretion, the Endocrines, Nervous System, and Special Senses. Prereq.: Course 103 or organic chemistry and neurology. 6 cred. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

105su,s. Roentgen Rays, Light, and Radium. The physical and physiological basis of physical therapy. 1 cred. Dr. Stenstrom.

113su,f,w,s. Problems in Physiology. Arranged by instructors with qualified students. Each student will be assigned a topic for special laboratory study, leading in some cases to original investigation. Conferences and reading. May be taken one or more quarters. Prereq.: Courses 103, 104, or equiv. 3 cred. per quarter or ar. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

135f,w,s.* Conference on Physiology, with qualified students. 1 cred. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

170f,w,s,su. Problems in Biophysics. Investigations of the effects of Roentgen, radium, visible, and ultraviolet radiation may be undertaken. Instruments are available for spectrophotometric work in the visible and ultraviolet regions for temperature measurements by means of thermocouples, and to a certain extent for electrical measurements. Hours and cred. ar. Dr. Stenstrom.

201f,w,s,su.* Seminar in Physiology and Physiological Chemistry. For instructors and advanced students. Cred. ar. Dr. Visscher, Dr. Armstrong.

202f,w,s,su.* Readings in Physiology. Topics will be selected for each student, and written reviews will be prepared and discussed. 1 to 3 cred. Dr. Visscher, Dr. Gellhorn, Dr. Hemingway, Dr. King, Dr. Lifson.

203f,w,s,su. Research in Physiology. Hours and cred. ar. Dr. Visscher, Dr. Wells, Dr. Hemingway, Dr. King, Dr. Lifson.

204f,w,s,su. Research in Physics and Physiology of Radiation. Cred. ar. Dr. Stenstrom.

206s.* Seminar in History of Physiology and Related Sciences. 1 cred. Dr. Visscher.

208f,w,s. Clinical Physiology and Physiological Chemistry. Hours and cred. ar. Dr. Wells, Dr. Glick, and others.

Experimental Physiology

B. Courses Offered in the Mayo Foundation

Professors Frank C. Mann, M.D., M.A., D.Sc., Jesse L. Bollman, M.S., M.D., Charles F. Code, M.D., Ph.D. in Physiol., Hiram E. Essex, Ph.D., William H. Feldman, D.V.M., M.S., George M. Higgins, Ph.D., Victor Johnson, M.D., Ph.D., Carl F. Schlotthauer, D.V.M., Khalil J. Wakim, M.D., Ph.D. in Physiol.; Associate Professors Eunice V. Flock, Ph.D., Julia F. Herrick, Ph.D.; Assistant Professors Grace M. Roth, Ph.D., Earl H. Wood, M.D., M.S., Ph.D.; Instructors John H. Grindlay, M.D., M.S. in Exp. Surg., M.S. in Surg., George A. Hallenbeck, M.D., Ph.D. in Physiol., H. Frederic Helmholz, Jr., M.D., Alfred G. Karlson, D.V.M., Ph.D., Edward H. Lambert, M.D., Ph.D.

Many of the opportunities for graduate work in physiology in the Mayo Foundation occur in connection with the Departments of Medicine and Surgery. In addition to these, advanced work is offered in the department to a limited number of well-prepared students majoring in physiology.

COURSES

M293f,w,s,su. Research Work on Selected Problems in Experimental Physiology. Dr. Mann, Dr. Bollman, Dr. Code, Dr. Essex, Dr. Higgins, Dr. Flock, Dr. Herrick, Dr. Roth, Dr. Wood, Dr. Grindlay, Dr. Hallenbeck, Dr. Helmholz.

PHYSIOLOGICAL CHEMISTRY

Professor Wallace D. Armstrong, M.D., Ph.D., Karl Sollner, Ph.D.; Associate Professors Cyrus P. Barnum, Ph.D., David Glick, Ph.D., Walter O. Lundberg, Ph.D.; Assistant Professors Saul L. Cohen, Ph.D., Elizabeth Frame, Ph.D.

Prerequisites—Students in this department are required to have a Bachelor's degree with a major in chemistry or physics and a minor in some other science. Organic chemistry is required of all students, and in addition physical chemistry is required of candidates for the Ph.D. degree.

Master's degree—Work for the Master's degree is offered under Plan A.

Doctor's degree—Work for the Ph.D. degree is offered in this department.

COURSES

100f,su-101w,su. Physiological Chemistry. The components of the animal body; foods, digestion, excreta, and metabolism. Prereq.: physics, organic chemistry. 13 cred. Dr. Armstrong, Dr. Barnum, Dr. Glick, Dr. Cohen, Dr. Carr.

153f,w,s,su. Problems in Physiological Chemistry. Special work arranged with qualified students. May be taken one or more quarters. Prereq.: Course 100-101. Hours and cred. ar. Dr. Armstrong, Dr. Barnum, Dr. Glick, Dr. Lundberg, Dr. Cohen, Dr. Frame.

154f,w,s. Conference in Physiological Chemistry. 1 cred. Dr. Armstrong, Dr. Barnum, Dr. Glick, Dr. Cohen, Dr. Frame.

155f,w,s. Seminar and Conference on Dental and Oral Biochemistry. Reports on assigned topics and discussions of current literature. Prereq.: Course 100-101 or 56-57. Hours and cred. ar. Dr. Armstrong.

200f,w,s. Seminar in Physiological Chemistry. 1 cred. Staff.

205f,w,s,su. Research in Physiological Chemistry. Hours and cred. ar. Dr. Armstrong, Dr. Barnum, Dr. Glick, Dr. Lundberg, Dr. Sollner, Dr. Cohen, Dr. Frame.

206f.§ Advanced Endocrinology and Steroid Chemistry. Prereq.: Course 100-101. 3 cred. Dr. Cohen. (Offered in sessions which begin with an odd-numbered year.)

207w.§ Ionic Equilibria and Mineral Metabolism. Prereq.: Course 100-101. 3 cred. Dr. Armstrong. (Offered in sessions which begin with an odd-numbered year.)

208s. Advanced Laboratory Technique. Limited to 10 students. Prereq.: Course 100-101. 3 cred. Staff. (Offered in sessions which begin with an odd-numbered year.)

209f.§ Histochemistry. Prereq.: Course 100-101 and histology or permission of instructor. 3 cred. Dr. Glick. (Offered in sessions which begin with an even-numbered year.)

210w.§ Advanced Carbohydrate Metabolism. Prereq.: Course 100-101. 3 cred. Dr. Frame. (Offered in sessions which begin with an even-numbered year.)

211s.§ Advanced Protein Metabolism. Prereq.: Course 100-101. 3 cred. Dr. Barnum. (Offered in sessions which begin with an even-numbered year.)

BIOCHEMISTRY

B. Courses Offered in the Mayo Foundation

Professors Edward C. Kendall, Ph.D., D.Sc., Walter M. Boothby, M.D., M.A.; Associate Professors Harold L. Mason, Ph.D., Marschelle H. Power, Ph.D.; Instructors Gerhard A. Fleisher, Ph.D., H. Frederic Helmholz, M.D., Vernon R. Mattox, Ph.D., Bernard F. McKenzie, M.S.

Many of the opportunities for graduate work in biochemistry in the Mayo Foundation are in connection with the Departments of Medicine, Pediatrics, and Clinical Pathology, for which see announcements under these several departments. In addition to these, advanced work is offered in the Department of Biochemistry to a limited number of well-prepared students majoring in biochemistry.

COURSES

M257f,w,s,su. Nutrition. (See Department of Medicine.)

M294f,w,s,su. Biochemistry. Research work in problems related to metabolism and the chemistry of the blood; includes training in the use of methods of organic and inorganic analysis. Dr. Kendall, Dr. Boothby, Dr. Mason, Dr. Power, Dr. Helmholz, Dr. Mattox, Dr. Fleisher, Mr. McKenzie.

In addition to the above, students majoring in biochemistry may carry on research work in experimental physiology. For details, see that department.

§ Offered only if 8 or more students are registered.

PHYSIOLOGICAL HYGIENE

(A Division of the School of Public Health)

Professor Ancel Keys, Ph.D.; Associate Professors Olaf Mickelsen, Ph.D., Ernst Simonson, M.D.; Assistant Professors Josef M. Brozek, Ph.D., Austin F. Henschel, Ph.D., Henry L. Taylor, Ph.D.

Language requirements—In exceptional cases substitution of Spanish or Russian for French may be permitted by petition.

Master's degree—Work is offered for the Master's degree under Plan A.

Doctor's degree—Work is offered in physiological hygiene leading toward the Ph.D. degree.

COURSES

P.H.190w. Science of Human Nutrition. Evaluation of nutritional status, surveys, undernutrition and malnutrition, special dietetics in social relief and medical practice. Prereq.: 8 cred. in organic chemistry or biochemistry and Courses 91 and 92 or Physiol. 103 or equiv. and permission of instructor. 3 cred. Dr. Keys, Dr. Mickelsen.

P.H.192w. Physiology of Exercise. Mechanics of motion, physical training and de-training, acute and chronic effects of exercise, muscular efficiency, muscular defects. Prereq.: Course 92 or Physiol. 103 or equiv. and permission of instructor. 4 cred. Dr. Keys and staff.

P.H.194f. Human Factors in Industry. Primarily for students in the Schools of Business Administration and of Public Health, and the Institute of Technology. Job requirements, physiological cost of work, industrial fatigue, industrial hazards, environment, accidents, absenteeism. Prereq.: 20 cred. in at least two of the following: chemistry, biology, psychology, engineering. 3 cred. Dr. Simonson, Dr. Brozek.

P.H.202w. Nutrition in Public Health. Current developments in nutrition related to public health. Limited enrolment. 1 cred. Dr. Keys, Dr. Mickelsen. (To be offered in 1948-49 and alternate years.)

P.H.204f. Tests and Measurements in the Appraisal of Human Physical Fitness. Current developments in the measurement of strength, endurance, co-ordination, and fitness. Limited enrolment. 1 cred. Dr. Simonson, Dr. Brozek, Dr. Henschel. (To be offered in 1948-49 and alternate years.)

P.H.206w. Gerontology. Physiological and psychological problems of old age. Limited enrolment. 1 cred. Dr. Brozek, Dr. Taylor. (To be offered in 1947-48 and alternate years.)

P.H.208f. Human Adaptation in Health and Disease. The human body as a whole and its responses to physiological and pathological stresses. Limited enrolment. 1 cred. Dr. Keys and staff. (To be offered in 1947-48 and alternate years.)

P.H.220f,w,s. Readings in Problems of Physiological Hygiene. Prereq.: permission of instructor. Cred. ar.

A. Electrocardiographic Interpretation. Dr. Simonson.
B. Industrial Fatigue. Dr. Brozek.
C. Physical Training and De-training. Dr. Henschel.
D. Human Climatology. Dr. Taylor.
E. Circulatory Mechanics. Dr. Keys.
F. Vitamin Metabolism. Dr. Mickelsen.
G. State and Function of Human Muscle. Dr. Simonson.

P.H.290f,w,s. Research in Physiological Hygiene and Related Areas. Cred. ar. Staff.

PUBLIC HEALTH

Professors Gaylord W. Anderson, M.D., Dr.P.H., Director, Ruth E. Boynton, M.D., M.S., Harold S. Diehl, M.A., M.D., D.Sc., James A. Hamilton, M.C.S., Charles A. Mann, Ph.D., J. Arthur Myers, M.D., Ph.D., Harold A. Whittaker, B.A.; Associate Professors Ruth E. Grout, Ph.D., C.P.H., Theodore A. Olson, M.A., George O. Pierce, M.S., C.P.H., James W. Stephan, M.B.S., Margaret S. Taylor, M.A., Alan E. Treloar, Ph.D., Myron M. Weaver, M.D., Ph.D.; Assistant Professors Janice E. Mickey, M.S., Stewart C. Thomson, M.D., M.S.; Lecturers Leslie W. Foker, M.D., M.P.H., William A. Jordan, D.D.S., M.P.H., Paul W. Kabler, M.D., Ph.D., Edwin J. Simons, M.D.

Committee on Curriculum for Physicians: Gaylord W. Anderson, Albert J. Chesley, Harold S. Diehl.

Committee on Curriculum for Engineers: Gaylord W. Anderson, Harold A. Whittaker.

Committee on Curriculum for Nurses: Gaylord W. Anderson, Margaret S. Taylor, Ann Nyquist.

Master's degree—Work for the Master's degree is offered under both Plan A and Plan B. All candidates for a Master's degree must take basic courses in (1) public health administration, (2) epidemiology, (3) statistics, (4) sanitation, (5) public health nursing, and (6) health education, unless specifically excused by the department.

[Inquiries concerning other work in public health, including the course of study leading to the professional degree of master of public health, and the course leading to the professional degree of master of hospital administration, should be addressed to Director, School of Public Health, Millard Hall, University of Minnesota, Minneapolis 14, Minnesota.]

COURSES

100f,s. Preventive Medicine. Environmental and biological factors in the maintenance and transmission of disease, and the possibilities of control or prevention through the efforts of the private physician alone or in collaboration with community, state, or federal agencies. 5 cred. Dr. Anderson and associates.

102f. Environmental Sanitation I. Methods for promoting man's health and comfort by controlling his environment: water supply sanitation, food sanitation, pollution abatement; sewage, excreta, and waste disposal; bathing place sanitation, air hygiene, illumination, housing, control of insect and animal vectors of disease, industrial hygiene and sanitation. Prereq.: Course 50 or 51 or 53 or 100 or permission of instructor, or may be taken concurrently with any of these. 3 cred. Mr. Whittaker, Mr. Olson, Mr. Pierce.

103f,w,s.* Public Health Bacteriology. Bacteriologic and serologic diagnosis, public health laboratory administration and methods. Prereq.: Bact. 101-102, 116, and permission of instructor. 3 cred. Dr. Kabler.

104f.* Epidemiology I. Factors underlying the spread of infectious diseases, with detailed discussion of selected diseases; simple statistical and epidemiologic methods in the study of diseases. Lect., lab., and seminars. Prereq.: Course 53 or 100 or permission of instructor; physicians, others by permission. Should be taken in conjunction with Course 140. 3 cred. Dr. Anderson.

105w. Epidemiology II. Epidemiology of special diseases; further statistical methods. Prereq.: Course 104. 3 cred. Dr. Anderson, Dr. Treloar.

106w.* Public Health Administration. Structure, basic functions, and activities of public health agencies; public health laws and regulations; administrative procedures in public health practice; relationship to other governmental and social activities. For physicians, engineers, nurses, social workers, and others by arrangement. Prereq.: Courses 53, 100, or equiv., or to be taken simultaneously with any of these. 3 cred. Dr. Anderson.

107f. Child and Adult Hygiene. Promotion of hygiene through public health and community effort—maternal, infant, preschool, school, college, industrial, and adult. Lect. and field trips. For physicians and graduate students in public health nursing or medical social work. Prereq.: Course 53 or 100. 3 cred. Dr. Boynton and associates.

108w. Care of the Handicapped Child. Extent of problem; history and development of program for care; types of physical defects; means of prevention and correction; medical social aspects; mental and emotional aspects; vocational training and placement. Prereq.: Course 53, 57, 58, or 100. 2 cred. Dr. Simons.

112w.¶ Water Supply Sanitation. Sanitary problems associated with the location, construction, and operation of water supplies, purification works, and distribution systems. Public health supervision of water supplies. Lect., field, and lab. demonstrations. Prereq.: Courses 102, 104. 4 cred. Mr. Whittaker, Mr. Olson, Mr. Pierce.

113w.¶ Sewage, Excreta, and Waste Disposal. Public health supervision of, and methods for, the treatment and disposal of sewage, excreta, garbage, and other wastes; methods for the study and control of stream, lake, and ground water pollution. Lect., field, and lab. demonstrations. Prereq.: Courses 102, 104. 4 cred. Mr. Whittaker, Mr. Olson, Mr. Pierce.

115s. Food Sanitation. Sanitary problems associated with the production, processing, and distribution of milk, meat, shellfish, and other foods; methods of public health supervision. Lect., field, and lab. demonstrations. Prereq.: Courses 102, 104, 106. 3 cred. Mr. Olson, Mr. Adams.

116s.¶ Public Health Engineering Administration. Sanitary problems of urban and rural communities, administrative methods and procedures for their solution; organization of activities in the field of environmental sanitation. Lect., seminars, field, and lab. demonstrations. Prereq.: Courses 102, 106, and at least two of the following: Courses 112, 113, 115. 2 cred. Mr. Whittaker, Mr. Pierce, and special lecturers.

117s. Sanitary Biology. Plant and animal forms of importance in water supply, sewage disposal and bathing places; biology of shellfish, rodents, mosquitoes, flies, and other organisms as it pertains to public health. Lect. and lab. work. Prereq.: permission of instructor. Cred. ar. Mr. Olson.

118w.¶ Environmental Sanitation II. Public health supervision of activities in the field of urban and rural sanitation. Demonstration of methods of sanitary control of environmental factors. Lect., field, and lab. demonstrations. For physicians, nurses, veterinarians, and others by arrangement. Prereq.: Course 102. 2 cred. Mr. Whittaker, Mr. Olson, Mr. Pierce.

119f,w,s,su.‡ Field Practice in Environmental Sanitation. Prereq.: permission of instructor. Cred. allowed according to experience in this field. Mr. Whittaker, Mr. Pierce.

122s.* Public Health Administration Problems. Conference discussion of selected problems; budgeting and program planning; appraisal of public health procedures and activities. Prereq.: Course 106. 3 cred. Ar.

123f,w,s. Topics in Public Health. Selected readings in public health with discussion based on those readings. Prereq.: permission of instructor. Cred. ar. Staff.

125w. The Community Health Education Program. A course intended primarily for those preparing for leadership in community health education to include organization, administration, and evaluation of community health education programs and the selection, preparation, and use of media commonly employed in health education. Prereq.: Courses 53 or 100 or 104, and 106, or to be taken concurrently with 106. 3 cred. Miss Grout.

* With special outside work, these courses count toward the nine credits of independent work required for the Master's degree under Plan B.

‡ A fee of $1 per credit is charged for this course.

¶ Students who have taken Courses 112, 113, or 116 will not be given credit for Course 118.

126f. Industrial Health Problems I. Organization of industrial health services, state programs in industrial hygiene. Industrial hazards and their control. Procedures in industrial health services. Prereq.: Course 53 or 100, Chem. 1-2 or equiv., or permission of department. 3 cred. Dr. Foker.

127f,s. Industrial Health Problems—Nursing Aspects. Organization and administration of nursing service in industrial health programs. Duties of nurses in industry. Program planning; records, relationships; interdepartmental, professional, and community evaluation. Prereq.: to be taken in conjunction with Course 126. 1 cred. Ar.

128w. Industrial Health Problems II. Special health hazards, use of toxic materials, specific diagnostic procedures, safety devices. Prereq.: Course 126. 3 cred. Dr. Foker.

129f,w,s.‡ Field Work in Industrial Nursing. Planned observation visits to selected industrial health services to demonstrate range of industrial health problems. Supervised experience in industrial medical unit. Weekly conferences. Emphasis on practical functioning of the nurse in industrial and commercial organizations. Prereq.: Course 67. Cred. ar. Ar.

133w. Mental Hygiene Aspects of Public Health Nursing. Discussion of emotional factors underlying wholesome family relations and of problems which interfere with successful adjustment in family and community life. Illustrative case material related to problems met by the public health nurse will be used. Prereq.: Course 62 or experience. 3 cred. Dr. Clarke.

135s. Conservation of Hearing. Detection, prevention, and amelioration of hearing impairments as related to public health education, school, industrial, and public health nursing, and medical social service. Prereq.: Courses 53 or 100 and 62 or to be taken concurrently. 1 cred. Dr. Boies and associates.

136s. Sight Conservation. Conditions that impair human vision; community programs of vision testing and correction of defects; sight conservation programs. Prereq.: Courses 53 or 100 and 62 or to be taken concurrently. 1 cred. Dr. Hansen and associates.

137s. Dental Health. Conditions resulting in tooth decay and loss; preventive and corrective measures; mouth hygiene; community programs for dental health. Prereq.: Courses 53 or 100 and 62 or to be taken concurrently. 1 cred. Dr. Jordan.

138f,w,s.‡ Field Work in Child Hygiene. Field practice, conferences and seminars in prenatal, infant, and child care. Offered in conjunction with Rochester City Health Department and Rochester Child Health Projects. Prereq.: permission of instructor. Cred. ar. Dr. Aldrich, Miss Mouw, and associates.

140f.‡‡ Vital Statistics. See Biostatistics courses. To be taken only in conjunction with Course 104 or by permission.

141s. Social and Economic Aspects of Medical Care. A survey of social and economic forces affecting administration and financing of medical care; the need for sickness insurance, group hospitalization; the concern of government in the provision of prepaid medical care. Prereq.: Course 106 or permission of instructor. 3 cred. Dr. Weaver.

170s.* Supervision in Public Health Nursing. Nature of supervision, classification of activities; methods of supervision, including field visitation, individual counseling, group conferences, staff education programs, administrative functions of supervisors, preparation and selection of supervisors. Prereq.: Courses 53 or 100, 61, 63, and experience in public health nursing or by permission. 3 cred. Miss Taylor.

* With special outside work, these courses count toward the nine credits of independent work required for the Master's degree under Plan B.

‡ A fee of $1 per credit is charged for this course.

‡‡ A fee of $1 per quarter is charged for this course.

¶ Students who have taken Courses 112, 113, or 116 will not be given credit for Course 118.

171f,w,s.* Problems in Public Health Nursing. For advanced students who wish to work on special problems in public health nursing. Prereq.: Course 170 or permission of instructor. Cred. ar. Miss Taylor and associates.

173f,w,s.‡ Field Work in Supervision of Public Health Nursing. For public health nurses only. Prereq.: Course 170 or permission of instructor. Cred. ar. Miss Taylor and associates.

174f,w,s. Supervision Laboratory. Critical analysis of supervisory procedures. Construction of rating scales, experience and efficiency sheets, manuals, and other materials of supervision. Prereq.: public health nurses only; to be taken concurrently with Course 170. 2 cred. Miss Taylor.

190f,w,s.‡ Field Work in the Community Health Education Program. Three months of practical field experience in community health education under the supervision of qualified health educators. Details will be worked out in accordance with individual needs of the students. One academic year of approved study toward a Master's or Doctor's degree either in education or public health. Prereq.: Courses 125, 227. Cred. ar. Miss Grout and associates.

200f,w,s.* Research. Opportunities will be offered by the University and by the various co-ordinated organizations for qualified students to pursue research work. Cred. ar. Staff.

210f,w,s.* Seminar in Preventive Medicine and Public Health. Cred. ar. Staff.

227f,w,s. Problems in the Community Health Education Program. For advanced students who wish to pursue independent study and experimentation in health education. Cred. ar. Miss Grout and associates.

NOTE: See also courses in Biostatistics and Physiological Hygiene as well as courses leading to the professional degree of master of hospital administration.

RADIOLOGY

A. Courses Offered at the Medical School

Professors Leo G. Rigler, M.D., Head, K. Wilhelm Stenstrom, Ph.D.; Clinical Associate Professors Harold O. Peterson, M.D., and Walter H. Ude, M.D.; Clinical Assistant Professors J. Richards Aurelius, M.D., Daniel L. Fink, M.D., Oscar Lipschultz, M.D., Russell W. Morse, M.D.

Graduates of Class A schools who have completed at least one year of a satisfactory internship in a recognized hospital are eligible for an appointment as a medical fellow with stipend in radiology. Medical fellows without stipend are also accepted if there are available places.

Previous preparation in internal medicine or in pathology or both is desirable altho not required. All graduate students are required to take at least six months of pathology or its equivalent during their fellowship period. The course extends over a period of three years including the six months devoted to pathology. In the case of veterans or others who have been away from medical practice for a considerable period of time a preliminary program of education in the basic sciences and general medicine is highly desirable.

The fellowship period is spent in a number of institutions, and appropriate periods of time are devoted to the physics of radiation, biophysics, radiation therapy, radiographic technique, and Roentgen diagnosis. Co-operation with the Department of Physics and the inclusion of a division of biophysics permits the opportunity of thoro training in the fundamental physics of radiation. Sufficient time is spent on the application of superficial and deep radiation therapy, both with the Roentgen rays and radium, to give a thoro

* With special outside work, these courses count toward the nine credits of independent work required for the Master's degree under Plan B.

‡ A fee of $1 per credit is charged for this course.

working knowledge in this field. Appropriate periods of time in the various divisions of Roentgen diagnosis are offered including extensive devotion to fluoroscopy.

The medical fellows are expected to assist in the teaching of undergraduate students and will be given opportunity to teach independently in elective courses. A certain amount of investigation and research should be carried out during the course of the program. All fellows are expected to qualify for the degree of master of science in radiology, and where appropriate research is undertaken qualifications for the Ph.D. degree in radiology can be undertaken. In the latter case a period of four years is usually required.

The following institutions are used for purposes of practical training in the field of radiology in co-operation with and under the general direction of the Department of Radiology of the University of Minnesota:

1. **University Hospitals and Out-patient Department**—This offers an unusual clinical material of a chronic nature including especially gastrointestinal, chest, bone, and urological cases. Extensive tumor material is available and the character of the material lends itself exceedingly well to the study of the Roentgen diagnosis and radiation therapy of tumors.

Included within the University Hospitals group are (a) Cancer Institute. This is a division of the University Hospitals with an out-patient clinic and offers a wide variety of material for the study of all types of tumors both from the diagnostic and therapeutic standpoints. It is fully equipped with the newest type of Roentgen therapy machines and has a radium emanation plant. (b) The Eustis Hospital. This division of the University Hospitals offers an excellent opportunity for the study of orthopedic and pediatric cases. (c) The Students' Health Service. The close connection of the University Hospitals with the Students' Health Service gives opportunity for diagnostic study in a valuable group of cases presenting especially acute conditions in young adults. Opportunity for the observation of routine roentgenographic and photofluorographic examinations of the chest in normal individuals, for the diagnosis of pulmonary tuberculosis in its incipiency, and for the study of gastrointestinal lesions in their earliest stages is especially good.

2. **Minneapolis General Hospital**—A residency for a period of time in this institution gives valuable experience particularly in the acute pulmonary conditions, in chronic cardiac diseases, and in traumatic lesions of the skeleton. Certain fellows will be assigned to this service for a period of not less than one year.

3. **Ancker Hospital, St. Paul**—Here, as in the Minneapolis General Hospital, there is abundant opportunity to observe both acute and chronic processes. In addition, the tuberculosis division of this hospital gives opportunity for the study of tuberculosis in its various forms.

4. **Veterans Administration Hospital**—For veterans there is available a period of service in the Veterans Hospital. This offers an unusual opportunity for the study of a wide variety of conditions found amongst veterans.

5. **Miller Hospital, St. Paul**—Certain fellows will be assigned for a period of time not to excede 18 months to service in this hospital where experience can be obtained in an institution serving both private and free patients and having an active out-patient division.

COURSES

102f,w,s. X-Ray Conference. Weekly departmental meetings at which the important cases seen in the University, Minneapolis General, Ancker, and Veterans Administration hospitals during the previous period are reviewed. 1 cred. Dr. Rigler and staff.

104w,s. Roentgen and Radium Therapy. Lectures on theory and practice of Roentgen and radium therapy. 1 cred. Dr. Stenstrom.

111f,w,s,su. Medical Roentgenologic Conference for Medical Clerks. Part of Medicine 111. 9 hours. 1 cred. Dr. Rigler.

124f,w,s,su. Pediatric-Roentgenologic Conference for Pediatric Clerks. Part of Pediatrics 124. 9 hours. 1 cred. Dr. Rigler.

137f,w,s,su. Surgical Roentgenologic Conference for Surgical Clerks. Part of Surgery 135. 9 hours. 1 cred. Dr. Rigler.

163af,w,s,su. Neurosurgical-Roentgenologic Conference for Neurosurgical Clerks. Part of Surgery 163. 9 hours. 1 cred. Dr. Peterson, Dr. Peyton.

200f,w,s,su. Research in Roentgenology. Problems in Roentgen diagnosis. Hours and cred. ar. Dr. Rigler.

201f. Roentgen Diagnosis of Diseases of the Head and Upper Respiratory Tract. A special course covering the Roentgen diagnostic procedures and the Roentgen findings in the study of the head, including diseases of the skull, sinuses, mastoids, orbits, intracranial conditions, and in the study of the upper respiratory passages. 2 cred. Dr. Peterson.

205f,w,s,su. Research Related to Radiation Therapy. Hours and cred. ar. Dr. Stenstrom.

206f,w,s,su. Roentgenoscopy. The theory and practical application of roentgenoscopy particularly to diseases of the gastrointestinal tract, lungs, and heart. Hours and cred. ar. Dr. Rigler.

207f,w,s,su. Roentgen and Radium Therapy. Treatments of patients under supervision both with medium and high voltage machines and with radium. Problems in connection with these treatments will be thoroly discussed. Hours and cred. ar. Dr. Stenstrom.

208f,w,s. Radiology Seminar. Weekly presentations of research studies or reviews of the literature on subjects of importance in radiology. 1 cred. Dr. Rigler, Dr. Stenstrom.

209f,w,s,su. Roentgen Diagnosis. The theory and practical application of Roentgen diagnostic methods to medical cases in general. Hours and cred. ar. Dr. Rigler.

210f,w,s,su. Roentgen Technique. A consideration of the theory and practical application of the principles of Roentgen technique including the study of X-ray machines and X-ray tubes, exposure, technique, and darkroom work. Hours and cred. ar. Dr. Rigler.

211w. Roentgen Diagnosis of Diseases of Gastrointestinal Tract. 1 cred. Dr. Morse.

212s. Roentgen Diagnosis in Obstetrics and Gynecology. 1 cred. Dr. Ude.

213f. Roentgen Diagnosis of Pulmonary Diseases. 1 cred. Dr. Rigler, Dr. Hanson.

214w. Roentgen Diagnosis of Diseases of Bones and Joints. 1 cred. Dr. Rigler.

215s. Roentgen Diagnosis of Diseases of Gallbladder and Urinary Tract. 1 cred. Dr. Aurelius.

216w. Roentgen Diagnosis of Traumatic Lesions of the Skeleton. 1 cred. Dr. Lipschultz.

217f. Theory and Practice of Radiation Therapy. 1 cred. Dr. Stenstrom, Dr. Hansen.

220f,w,s,su. Urologic-Roentgenologic Conference for Graduate Students. 1 cred. Dr. Stauffer.

240f,w,s,su. Radiation Therapy Conference. A discussion of details of treatments of specific patients. 1 cred. Dr. Stenstrom.

B. Courses Offered in the Mayo Foundation

Professors Byrl R. Kirklin, M.D., Harry H. Bowing, M.D., Arthur U. Desjardins, M.D., M.S. in Rad.; Associate Professors John D. Camp, M.D., Robert E. Fricke, M.D., Eugene T. Leddy, M.D.; Assistant Professors Clarence A. Good, Jr., M.D., M.S. in Rad., Walter C. Popp, M.D., M.S. in Derm., Harry M. Weber, M.D.

All branches of work with the X ray and radium as applied to medicine are covered in the Mayo Foundation. The fundamental plan gives the graduate student an opportunity for an intimate observation of cases and practical experience in routine work. In addition,

informal didactic instruction is given as occasion presents. Frequent seminars are held. The library of the clinic and that of the section are well supplied with texts and journals dealing with radiology. Free use of them is expected. Individual research is encouraged in any radiologic problem which especially interests the student.

COURSES

M286f-w,w-s,s-su,su-f. Necropsy Service. (See Department of Pathology.)

M295f,w,s,su. General Roentgenologic Technique. At least three months' service. Practical experience in all varieties of roentgenologic apparatus including transformers, vacuum tubes, tables, films, intensifying screens, etc. This training in roentgenologic technique is intended to prepare the fellow to make roentgenograms in connection with his subsequent work. Unless the fellow proposes to take physics as his minor, he must also, during this period, become acquainted with the physics of the Roentgen ray. Dr. Kirklin, Dr. Camp, Dr. Good, Dr. Weber.

M296f,w,s,su. Applied Roentgenologic Diagnosis. At least eighteen months' service. Student will be given opportunity to become familiar with the roentgenography of the osseous system, chest, heart, lungs, and urinary system, and with special techniques required in roentgenography of the accessory sinuses, mastoids, teeth, genitourinary tract, ventricles of the brain, and other special anatomical regions. Unusual facilities and material are at hand for the roentgenoscopy and roentgenography of the gastrointestinal tract. Thoro training is obtainable in the reading of films and screen images, the recognition of normal and abnormal conditions, the Roentgen signs of disease, both direct and indirect roentgenologic diagnosis, the correlation of plate and screen findings, and the correlation of clinical and roentgenologic findings. Cholecystographic interpretation is given special attention. Seminar. During this period of eighteen months fellows have brief services in rotation with the Departments of Urology, Obstetrics and Gynecology, Neurology and Psychiatry, and Dentistry. Seminar. Dr. Kirklin, Dr. Camp, Dr. Good, Dr. Weber.

M297f,w,s,su. Roentgen Therapy. At least six months' service. Fellows have the privilege of examining patients affected with the various benign and malignant diseases to which Roentgen treatment is applicable, and of observing its effects, both early and late. Techniques suitable for the various conditions are taught by practical demonstration. Instruction is given in radiation physics and in the prevention of untoward effects from therapeutic applications of the Roentgen ray and the avoidance of danger from high tension currents. Seminar. Dr. Desjardins, Dr. Leddy, Dr. Popp, Dr. M. M. D. Williams.

M298f,w,s,su. Radium Therapy. At least three months' service. Techniques are demonstrated in the preparation and application of radium tubes, needles, and plaques for therapeutic use, with methods of protection from injury. A large number of patients and an adequate supply of radium permit a practical exhibition of its application in general surgery, gynecology, ophthalmology, internal medicine, and diseases of the ductless glands, showing the dosage, biologic effects, and reactions. Seminar. Special instruction in radiation physics is given. Dr. Bowing, Dr. Fricke, Dr. M. M. D. Williams.

In addition to the above, students majoring in radiology may take work in biophysics and experimental physiology. For details, see these departments.

SURGERY

(Including Divisions of General Surgery, Anesthesiology, Neurosurgery Orthopedic Surgery, Proctology, and Urology)

General Surgery

A. Courses Offered at the Medical School

Professors Owen H. Wangensteen, M.D., Ph.D., Head, Alexander R. Colvin, M.D., Clarence Dennis, M.D., Arthur A. Zierold, D.D.S., M.D., Ph.D.; Clinical Professors Orwood J. Campbell, M.D., Ph.D., Walter A. Fansler, M.A., M.D., Harry B. Zimmerman, M.D.; Associate Professor Richard L. Varco, M.D.; Clinical Associate Professors George S. Bergh, M.D., Ph.D., M. Logan Leven, M.D., Ph.D., Charles E. Rea, M.D., Ph.D., Edward A. Regnier, M.D.; Assistant Professors Fred Kolouch, Jr., M.D., Ph.D., K. Alvin Merendino, M.D., Ph.D., David State, M.D., Ph.D.; Clinical Assistant Professor Lyle J. Hay, M.D.; Instructors Arnold J. Kremen, M.D., Ph.D., Edgar A. Webb, M.D., Roscoe C. Webb, M.D.; Clinical Instructor Baxter A. Smith, Jr., M.D., Ph.D.

Graduate work in surgery in the Medical School is designed to offer superior training to a limited number of fellows in three or more years of residence. The practical and scientific aspects of a well-rounded surgical course are emphasized equally.

The prospective fellow must be able to qualify as a candidate for the Ph.D. degree so far as his preliminary education is concerned. (See Requirements for Advanced Degrees, pages 8-11.

The fundamental laboratories of the Medical School offer numerous graduate courses closely related to surgery. (See statements of Anatomy, Bacteriology, Pathology, Pharmacology, Physiology, and Physiological Chemistry.) Opportunity for special investigative and research work is found in these departments. The minor subjects must be taken in one of the above departments. The proximity of the medical buildings and arrangement of courses afford opportunity for co-ordination of clinical and laboratory work which is highly desirable.

The courses offered by the Department of Surgery consist of animal, experimental, and cadaver surgery, together with work in the hospital and out-patient department in surgical diagnosis, operative surgery, and some of the surgical specialties.

Unexcelled opportunities for technical and experimental work under aseptic conditions comparable to a first-class operating room are offered in the laboratories of animal and experimental surgery. In these laboratories the fellow conducts his investigative work for his thesis.

The University Hospitals fellowship provides a house surgeonship in the University Hospitals, with or without residence. The resident surgeon is chosen from among the surgical fellows of whom there are usually seven to ten. The fellows, in turn, are chosen yearly largely from our own surgical intern group. The fellow aids the surgical staff in diagnosis and in the preoperative and postoperative care of patients. He helps to direct and supervise the work of the interns, and after his first year assists in the bedside teaching of the surgical clerks. He acts as first assistant in operations performed by the general surgical staff. As soon as he proves himself capable, the more simple major operations are delegated to him to perform, with the surgeon acting as first assistant. Later he is permitted to operate under the supervision of the surgeon, and finally, when he has demonstrated his ability, he operates independently. Increasingly difficult cases are assigned as his ability warrants. Supervision is always given until the staff surgeon is satisfied concerning the fellow's ability to operate independently.

Medical School surgical fellowships are offered also at the Minneapolis Veterans Hospital (25), Minneapolis General Hospital (5), Ancker Hospital, St. Paul (3), Miller Hospital, Private, St. Paul (2), Northwestern Hospital, Private, Minneapolis (2), St. Barnabas Hospital, Private, Minneapolis (2). Arrangements can be made for rotation between the surgical services of the various affiliated hospitals and the service at the University of Minnesota Hospitals.

COURSES

101f,w,s. Out-patient Clinic in Surgery. The student is required to assist in the out-patient surgical clinic, and in this connection makes a special study of the diagnosis and treatment of selected cases. Staff.

102f,w,s. Applied Surgical Anatomy on the Cadaver. Weekly exercises in which the student prepares anatomical dissections on the cadaver illustrating anatomic principles important to the surgeon.

105f,w,s. Proctoscopy and Sigmoidoscopy. The treatment and diagnosis of the pathological conditions found in the lower bowel, including minor surgical operations.

134f,w,s. Tumor Clinic. A combined clinical and pathological consideration of tumors. In so far as available material permits, a systematic presentation of the manifestations and effects of malignant tumors which come in the province of general surgery and its divisions will be made. University Hospitals surgical staff.

135f,w,s. Surgical Ward Conference. A weekly exercise in which cases offering interesting problems are presented by the student. University Hospitals surgical staff.

137f,w,s. Roentgenological-Surgical Conference. A weekly exercise in which the films of all surgical patients presenting interesting Roentgen findings are reviewed. Staffs of the Departments of Radiology and Surgery.

138f,w,s. Medico-Surgical Pathological Conference. A weekly exercise in which the student prepares instructive cases for review by the medical, surgical, and pathological staffs.

205f-206w-207s. Surgical Diagnosis. In this course the graduate student assists in the practical instruction of the clinical clerks and interns in the University Hospitals, and makes a special study of problems in surgical diagnosis on patients in the Out-patient Department as well as in the wards. University Hospitals, Dr. Wangensteen, Dr. Dennis, Dr. Varco, Dr. Kolouch, Dr. Merendino, Dr. State.

208f-209w-210s. Surgical Service. The graduate student acts as house surgeon and in connection with the service is required to make a special study of the patients, preparing them for clinics and observing them after operations. University Hospitals. Dr. Wangensteen, Dr. Dennis, Dr. Varco, Dr. Kolouch, Dr. Merendino, Dr. State.

211f-212w-213s. Operative Surgery. In this course the surgical fellow acts as first assistant at all operations by the surgical staff in the University Hospitals. When properly qualified, the fellow will be permitted to operate, beginning with simpler surgical procedures. University Hospitals. Dr. Wangensteen, Dr. Dennis, Dr. Varco, Dr. Kolouch, Dr. Merendino, Dr. State.

216f,w,s. Surgical Research. Properly qualified students may undertake original investigation of problems in either experimental or clinical surgery. University Hospitals surgical staff.

217f,w,s. Surgical Seminar. Conference for reports on surgical literature with presentation and discussion of especially interesting cases and problems as well as research work by members of the surgical staff. University Hospitals surgical staff.

225f-226w-227s. Surgical Diagnosis. In this course the graduate student assists in the practical instruction of the clinical clerks and interns in the Minneapolis General Hospital, and makes a special study of problems in surgical diagnosis on patients in the Out-patient Department as well as in the wards. Minneapolis General Hospital. Dr. Zierold, Dr. Dennis, Dr. Campbell, Dr. Fansler, Dr. Regnier.

228f-229w-230s. Surgical Service. The graduate student acts as house surgeon and, in connection with the service, is required to make a special study of the patients, preparing them for clinics and observing them after operation. Minneapolis General Hospital. Dr. Zierold, Dr. Dennis, Dr. Campbell, Dr. Fansler, Dr. Regnier.

231f-232w-233s. Operative Surgery. In this course the surgical fellow acts as first assistant at all operations by the surgical staff in the Minneapolis General Hospital. When

properly qualified, the fellow will be permitted to operate, beginning with simpler surgical procedures. Minneapolis General Hospital. Dr. Zierold, Dr. Dennis, Dr. Campbell, Dr. Fansler, Dr. Regnier.

236f,w,s. Surgical Research. Properly qualified students may undertake original investigation of problems in either experimental or clinical surgery. Minneapolis General Hospital, Dr. Zierold, Dr. Dennis, Dr. Campbell, Dr. Fansler, Dr. Regnier.

237f,w,s. Surgical Seminar. Conference for reports on surgical literature with presentation and discussion of especially interesting cases and problems as well as research work by members of the surgical staff. Minneapolis General Hospital surgical staff.

B. Courses Offered in the Mayo Foundation

Professors Donald C. Balfour, M.D., LL.D., Virgil S. Counseller, M.D., M.S. in Surg., Claude F. Dixon, M.D., M.S. in Surg., Stuart W. Harrington, M.D., M.S. in Surg., James C. Masson, M.D., J. de J. Pemberton, M.D., M.S. in Surg., LL.D., Waltman Walters, M.D., M.S. in Surg.; Associate Professors O. Theron Clagett, M.D., M.S. in Surg., Howard K. Gray, M.D., M.S. in Surg., Charles W. Mayo, M.D., M.S. in Surg., James T. Priestley, M.D., M.S. in Exper. Surg., Ph.D. in Surg., John M. Waugh, M.D., M.S. in Surg.; Assistant Professors B. Marden Black, M.D., M.S. in Surg., Edward S. Judd, Jr., M.D., M.S. in Surg., William R. Lovelace, M.D., M.S. in Surg., Frederick L. Smith, M.D.; Instructors Deward O. Ferris, M.D.C.M., M.S. in Surg., Paul C. Kiernan, M.D., M.S. in Surg.

The opportunities for preparation in surgery in the Mayo Foundation are principally in the field of surgical pathology, in general and surgical diagnosis, and in operative and experimental surgery.

Fellows majoring in surgery usually include in their work three months in postoperative care of ambulatory patients; six months in surgical pathology; and at least a year in general diagnosis. This general diagnostic work is divided into services of six months each. Fellows select the diagnostic sections in which they desire to work, and their requests are followed so far as arrangements of the schedule will permit. The work in the minor field, pathology, pathologic anatomy, and physiology, and at least one year of diagnostic work should be completed before the fellow begins his operative service.

In their operative service fellows act as second assistants in general and special surgery for a period of one year or longer. The service also includes postoperative care of all patients in the operative service in which the fellow is on duty. During this service, the fellow works in various rooms as second assistant and has occasional opportunity to act as first assistant. All second assistants are residents in the hospitals in which they are on operative service.

Fellows who are considered best qualified are appointed first assistants for a period of one or two years. This service may begin during the third year of residence. There are twenty such first assistantships available.

Operative service for fellows in general surgery is given at Colonial, Kahler, and St. Mary's hospitals.

The Colonial Hospital of 325 beds is utilized for general surgery, including emergency surgery, and a large part of the surgery of certain specialists: the thorax (Dr. Harrington, Dr. Clagett) and urology (Dr. Counseller, Dr. Priestley).

The Kahler Hospital contains 125 beds. Special surgical services in the thyroid (Dr. Pemberton, Dr. Black, Dr. Kiernan) and the colon (Dr. Pemberton) are provided.

St. Mary's Hospital contains over 750 beds, 400 of which are available for general surgery. There are also special services in gynecology (Dr. Counseller, Dr. Waugh), gastric surgery (Dr. Walters, Dr. Gray, Dr. Waugh), and colon surgery (Dr. Dixon, Dr. Mayo).

Group seminars are held regularly in the Department of Surgery.

COURSES

M255f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis. (See Department of Medicine.)

M256f,w,s,su. Medical Hospital Residence. (See Department of Medicine.)

M287f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. (See Department of Pathology.)

M299f,w,s,su. Postoperative Care of Patients. Treatment of complications, surgical and medical. Dr. Smith.

M309f,w,s,su. Intravenous Therapy. The work in intravenous therapy offers a large field for the study of problems related to blood physiology, the blood dyscrasias, and the causes and prevention of reactions following such therapy. Dr. Seldon.

M313f,w,s,su. Regional Anesthesia. The technique of field block and nerve block procedures will first be practiced upon the cadavar while the student observes the performance of the work on patients. During the latter half of the term opportunity will be provided for the student himself to perform these anesthetic procedures as part of the preoperative preparation of patients. Dr. Lundy, Dr. Tuohy, Dr. Adams, Dr. Seldon.

M302f,w,s,su. Surgical Technique. The purpose of this course is to develop surgical technique on animals. The fellows are paired and one operates while the other assists in performing the classical operations adaptable to experimental surgery. Open only to fellows in surgery. Dr. Mann, Dr. Bollman.

M303f,w,s,su. Operative Surgery. Second assistantship in operating rooms; substitute service as first assistant. Residence. Seminar. Dr. Counseller, Dr. Dixon, Dr. Harrington, Dr. Pemberton, Dr. Walters, Dr. Clagett, Dr. Gray, Dr. Mayo, Dr. Priestley, Dr. Waugh, Dr. Black, Dr. Ferris.

M304f,w,s,su. Surgery of the Genitourinary Organs. Operative techniques; study of special problems involved. Residence. Seminar. Dr. Walters, Dr. Counseller, Dr. Ferris, Dr. Kiernan.

In addition to the above, fellows majoring in surgery may take work in experimental physiology, necropsy service, neurosurgery, orthopedic surgery, proctology, radium therapy, Roentgen therapy, and urology. For details, see these divisions.

ANESTHESIOLOGY

A. Courses Offered at the Medical School

Clinical Professor Ralph T. Knight, M.D.; Clinical Associate Professor Joe W. Baird, M.D.; Clinical Instructor David B. Wilsey, M.D.

Graduate work in anesthesiology in the Medical School is designed to offer a superior training to a limited number of fellows. Opportunity is given for large clinical experience and investigative work in all types of general and regional anesthesia.

In addition, work in co-operation with other departments is available. The standards envisioned by the certifying specialty boards are fully met.

The degrees of M.S. and Ph.D. are offered in anesthesiology to students who fulfil all requirements for these degrees.

COURSES

207f-w-s-su. General Anesthesia. Observation and instruction in all types of clinical general anesthesia followed by administration under supervision, and finally by responsible administration and instruction of interns and clinical clerks. 12 cred. per quarter.

208f-w-s-su. Regional Anesthesia. Observation and instruction in all types of clinical, local, regional, and spinal anesthesia, followed by administration under supervision, and finally by responsible administration and instruction of interns and clinical clerks. 4 cred. per quarter.

209f-w-s-su. Pre- and Postoperative Evaluation. Observation of patients in the wards before and after operation with co-ordination of pathological conditions and risks with the selection and dosage of sedative and anesthetic drugs and methods. Also a statistical study of anesthesia case records in relation to pre- and postoperative complications and recovery. 2 cred. per quarter.

210f-w-s-su. Research in Anesthesia. In addition to the following special courses in the fundamental laboratories of the Medical School, specially qualified students may undertake investigation of anesthesia problems either in the laboratory of experimental surgery or in clinical anesthesia. Cred. ar.

211f-w-s-su. Seminar in Anesthesia. Regular conferences for review of literature of anesthesia and reports of specially interesting cases and problems as well as of research work being done by members of the Division of Anesthesiology. 2 cred. per quarter.

It is recommended that fellows in anesthesiology also register for courses in other departments selected from the following offerings:

Anat.129f-130w. Topographic Anatomy.

Med.202f,w,s,su. Diseases of the Cardiovascular Apparatus.

Pharmacol.103su,w. General Pharmacology, in continuation.

Pharmacol.109f,w,s,su. Pharmacological Problems.

Pharmacol.203su,f,w,s. Research in Pharmacology.

Physiol.113su,f,w,s. Problems in Physiology.

Physiol.203f,w,s,su. Research in Physiology.

Physiol.Chem.205f,w,s,su. Research in Physiological Chemistry.

Surg.137f,w,s. Roentgenological-Surgical Conference.

Surg.217f,w,s. Surgical Seminar.

B. Courses Offered in the Mayo Foundation

Professor John S. Lundy, M.D.; Associate Professor Edward B. Tuohy, M.D., M.S. in Anes.; Assistant Professors R. Charles Adams, M.D.C.M., M.S. in Anes., Thomas H. Seldon, M.D.C.M., M.S. in Anes.

Fellows in anesthesiology in the Mayo Foundation have opportunity for the study of methods of producing anesthesia as well as for study of numerous fields related to anesthesia. Seminars, lectures, and quizz sections are held routinely. The following is a list of suggested studies:

Local, regional, and spinal anesthesia, including diagnostic and therapeutic nerve blocks, intravenous and rectal anesthesia, intravenous therapy and blood transfusion.

Inhalation anesthesia, including endotracheal anesthesia.

General diagnosis, particularly in relation to cardiac and respiratory conditions.

Research in one or more of the basic sciences.

Special studies, including clinical topographic anatomy, biochemistry, biophysics, bronchoscopic aspiration and resuscitation, clinical pharmacology, serology and hematology, metabolism, and oxygen and other gas therapy.

When a fellow is particularly interested in study of a certain branch of anesthesia, arrangements may be made whereby he may stress that phase.

The following courses are recommended for fellows in anesthesiology:

COURSES

M253f,w,s,su. Physics in Relation to Anesthesia. (See Department of Biophysics.)

M255f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis. (See Department of Medicine.)

M285f,w,s,su. Clinical Hematology. (See Department of Pathology.)

M293f-w,w-s,s-su,su-f. Research Work on Selected Problems in Experimental Physiology. (See Departments of Physiology and Physiological Chemistry.)

M294f,w,s,su. Biochemistry. (See Departments of Physiology and Physiological Chemistry.)

M305f,w,s,su. Diagnostic and Therapeutic Nerve Block. Dr. Lundy.

M306f,w,s,su. Inhalation and Endotracheal Methods and Rectal Anesthesia. Dr. Lundy, Dr. Tuohy, Dr. Adams, Dr. Seldon.

M307f,w,s,su. Clinical Pharmacology as Related to Anesthesia; Intravenous Anesthesia including intravenous sedation and pre- and postoperative medication and care. Dr. Adams.

M308f,w,s,su. Oxygen Resuscitation and other Gas Therapy. Dr. Lundy.

M309f,w,s,su. Intravenous Therapy and Transfusion of Blood and Blood Substitutes. Dr. Seldon.

M310f,w,s,su. Spinal and Continuous Spinal Anesthesia. Dr. Lundy, Dr. Tuohy.

M311f,w,s,su. Caudal and Continuous Caudal Anesthesia. Dr. Lundy, Dr. Adams.

M312f,w,s,su. Bronchoscopic Aspiration. Dr. Tuohy, Dr. Adams, Dr. Seldon.

M313f,w,s,su. Regional Anesthesia. Dr. Lundy, Dr. Tuohy, Dr. Adams, Dr. Seldon.

M314f,w,s,su. Intravenous Technique and Venipuncture. Dr. Lundy, Dr. Tuohy, Dr. Adams, Dr. Seldon.

NEUROSURGERY

A. Courses Offered at the Medical School

Professor William T. Peyton, M.D., Ph.D.

Three-year fellowships in neurosurgery are offered leading to a graduate degree in neurosurgery. Dr. Peyton and staff.

COURSES

305. Neurosurgical Diagnosis. The neurosurgical fellow assists in the instruction of the clinical clerks and interns, and studies problems in diagnosis in the Out-patient Department and in the University Hospitals. Dr. Peyton.

308. Neurosurgical Service. The neurosurgical fellow acts as house surgeon at the University Hospitals. Dr. Peyton.

311. Operative Neurosurgical Surgery. The neurosurgical fellow acts as first assistant at operations in the University Hospitals, and later may be permitted to operate. Dr. Peyton.

316. Neurosurgical Research. Problems in experimental or clinical surgery. University Hospitals surgical staff. Dr. Peyton.

318. Neurosurgical Conference. A review of X rays and case histories on neurosurgical service.

B. Courses Offered in the Mayo Foundation

Professors Alfred W. Adson, M.D., M.S. in Surg., M.A., Winchell McK. Craig, M.D., M.S. in Surg.; Associate Professor J. Grafton Love, M.D., M.S. in Surg., Assistant Professor George S. Baker, M.A., M.D., M.S. in Surg.; Instructor Alfred Uihlein, M.D., M.S. in Surg.

Preparation for neurosurgery in the Mayo Foundation is made in the Departments of Pathology, Neurology and Psychiatry, and General Surgery.

COURSES

111f,su. Human Neurology. Dr. Rasmussen. (See Anatomy 111.)

M261f,w,s,su. Neuropathology. (See Division of Neurology and Psychiatry.)

M262f-w,w-s,s-su,su-f. Neurophysiology, Electroencephalography. (See Division of Neurology and Psychiatry.)

M263f,w,s,su. Diagnosis in Neurology. (See Division of Neurology and Psychiatry.)

M264f,w,s,su. Neurologic Hospital Service. (See Division of Neurology and Psychiatry.)

M286f-w,w-s,s-su,su-f. Necropsy Service. (See Department of Pathology.)

M315f,w,s,su. Surgery of the Nervous System. Operative technique and study of special problems involved. Residence. Seminar. Dr. Adson, Dr. Craig, Dr. Love, Dr. Baker, Dr. Uihlein.

In addition to the above, fellows in neurosurgery may take work in general pathology, experimental physiology, neuro-ophthalmology, and general surgery. For details, see these departments.

Orthopedic Surgery

A. Courses Offered at the Medical School

Professor Wallace H. Cole, M.D.

Three-year fellowships are offered leading to a degree in orthopedic surgery. This work is carried on at the University Hospitals, Gillette State Hospital for Crippled Children, Shriners Hospital for Crippled Children, etc., and there is an interchange with the Orthopedic Department of the Mayo Foundation. Dr. Cole and orthopedic staff.

COURSES

405. Orthopedic Diagnosis. The orthopedic fellow assists in the instruction of the clinical clerks and interns, and studies problems in diagnosis in the Out-patient Department and in the University Hospitals. Dr. Cole.

408. Orthopedic Service. The orthopedic fellow acts as house surgeon at the University Hospitals. Dr. Cole.

411. Orthopedic Operative Surgery. The orthopedic fellow acts as first assistant at operations in the University Hospitals, and later may be permitted to operate.

416. Orthopedic Research. Problems in experimental or clinical surgery. University Hospitals. Dr. Cole.

B. Courses Offered in the Mayo Foundation

Professors Ralph K. Ghormley, M.D., Melvin S. Henderson, M.D., Henry W. Meyerding, M.D., M.S. in Orth. Surg.; Assistant Professor H. Herman Young, M.D., M.S. in Orth. Surg.; Instructors William H. Bickel, M.D., M.S. in Orth. Surg., Mark B. Coventry, M.D., M.S. in Orth. Surg., Paul R. Lipscomb, M.D., M.S. in Orth. Surg.

Orthopedic surgery in the Mayo Foundation embraces not only the deformities of childhood but practically all deformities of the extremities and the spine in the adult. Fractures, recent and old; osteomyelitis, acute and chronic; bone tumors, etc., are taken care of in the orthopedic service. In addition all the usual congenital deformities such as clubfeet, dislocated hips, torticollis, etc., are seen on this service. The surgeon who is to cope successfully with such a broad field of surgery must have a sound general surgical training. Residences are available in St. Mary's Hospital and the Colonial Hospital. Here the hospital care of orthopedic patients is carried on. All emergency cases such as recent and compound fractures, acute osteomyelitis, etc., are also cared for. Services are confined to orthopedic diagnosis, treatment of nonoperative patients, manufacture and fitting of braces, and out-patient and postoperative service.

Fourteen three-year fellowships are available for fellows showing special adaptability for orthopedic surgery. Such fellows will have one year in orthopedic diagnosis, at least one year in orthopedic surgery, service in specialties closely allied to orthopedic surgery, and a minor either in pathology, anatomy, or neurology. Ample opportunity will be given the men majoring in orthopedic surgery for first assistantship in the operating room and in the office, and also for the study of the manufacture and use of orthopedic appliances. Seminars are held regularly.

There is also a department of physical medicine, in which fellows majoring in orthopedic surgery have opportunity to work.

Through an arrangement of exchange, fellows in orthopedic surgery in the Mayo Foundation may spend six months at the Gillette State Hospitals, St. Paul, working under the direction of Dr. W. H. Cole, where a wider experience in the care of orthopedic conditions in children may be secured.

COURSES

M287f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. (See Department of Pathology.)

M316f,w,s,su. Orthopedic Diagnosis. History taking and physical examination of orthopedic cases. Study of braces, material and construction, measurements and fitting; application and use of plaster of Paris; interpretation of radiograms of orthopedic cases; care of nonsurgical and postoperative cases. Seminar. Dr. Ghormley, Dr. Henderson, Dr. Meyerding, Dr. Young, Dr. Bickel, Dr. Coventry, Dr. Lipscomb.

M313f,w,s,su. Orthopedic Surgery. One year in service is offered to fellows majoring in orthopedic surgery. Seminar. Dr. Ghormley, Dr. Henderson, Dr. Meyerding, Dr. Young, Dr. Bickel, Dr. Coventry, Dr. Lipscomb.

In addition to the above, students majoring in orthopedic surgery may take work in necropsy service, experimental physiology, neurology, and physical medicine. For details, see these departments.

PROCTOLOGY

B. Courses Offered in the Mayo Foundation

Professors Louis A Buie, M.D.; Associate Professor Newton D. Smith, M.D.; Assistant Professor Raymond J. Jackman, M.D., M.S. in Proct.; Instructor John R. Hill, M.D., M.S. in Proct.

The section on proctology of the Mayo Foundation offers opportunities for the study of diseases of the terminal portion of the colon. Patients are referred to this section by physicians who are conducting clinical examinations. The chief complaint of the patient may be limited to some proctologic disorder, but often the proctologic investigation is desired in order to determine the relationship of the proctologic condition to some general disorder. Therefore, opportunity is provided to study diseases of the terminal portion of the colon and their relationship to systemic disorders. The major service in proctology extends over a period of three to four years, and includes a minimum of six months in a minor, usually pathology, approximately two to three quarters in general medical and surgical diagnosis with special reference to diseases of the intestines, three months in regional anesthesia with special reference to sacral anesthesia, in diagnostic roentgenology, in radium treatment of malignant and other conditions, and six to eight quarters in the diagnosis and surgical and other treatment of diseases involving the terminal portion of the colon.

COURSES

M255f-w,w-s,s-su,su-f. General Medical and Surgical Diagnosis. (See Department of Medicine.)

M256f,w,s,su. Medical Hospital Residence. Dr. Bargen, Dr. Brown, Dr. Wakefield. (See Department of Medicine.)

M287f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. (See Department of Pathology.)

M318f,w,s,su. Proctology. Dr. Buie, Dr. Smith, Dr. Jackman.

In addition to the above, fellows majoring in proctology may take work in experimental physiology, roentgenology, and regional anesthesia. For details, see these departments.

UROLOGY

A. Courses Offered at the Medical School

Professor Charles D. Creevy, M.D., Ph.D.; Clinical Instructor Baxter A. Smith, Jr., M.D.

Three-year fellowships, approved by the Council on Medical Education, leading to a graduate degree in urology. Dr. Creevy and staff.

COURSES

250f,w,s,su. Urological Surgery. Cred. ar.

251f,w,s,su. Cystoscopy and Urological Diagnosis. Cred. ar.

252f,w,s,su. Urological Conference. Cred. ar.

253f,w,s,su. Research in Urology. Cred. ar.

B. Courses Offered in the Mayo Foundation

Professor Gershom J. Thompson, M.D., M.S. in Urol.; Associate Professors Edward N. Cook, M.D., M.S. in Urol., John L. Emmett, M.D., M.S. in Urol.; Assistant Professor T. Lloyd Pool, M.D., M.S. in Urol.; Instructor Laurence F. Greene, M.D., Ph.D. in Urol.

The major training in urology extends over a period of three years. This includes a minimum of one and one-half years devoted to the diagnosis and treatment of diseases involving the urinary tract (including transurethral surgery), six months to one year in operative surgery, and at least six months in pathology or other basic science. The work is designed to provide a thoro experience in the diagnosis and treatment of diseases involvin the urinary tract.

Clinical experience is enlarged by service as resident in the urologic service of the Colonial Hospital. In this service the resident has opportunity to take part in the preoperative and postoperative treatment of urologic conditions, as well as in the urologic diagnosis of patients under observation in the Colonial Hospital. He also acts as assistant in transurethral surgery.

The surgical training consists of work as second assistant in general and urologic surgery. Opportunity is given to observe a large number of patients operated on for diseases involving the urinary tract and associated organs. Additional opportunity is offered to assist in operations for general surgical conditions, and particularly general abdominal surgery.

Urologic diagnosis and treatment include cystoscopy, urethroscopy and urography (both retrograde and excretory). There is also an extensive service in transurethral surgery, which includes fulguration, diathermy, removal of foreign bodies from the bladder and urethra, lithotrity, dilation of strictures of the urethra and ureter, manipulation of ureteral stone, pelvic lavage, electrocoagulation and insertion of radium in neoplasms of the bladder and urethra. The fellow is given opportunity personally to examine patients and familiarize himself with the diagnosis and treatment of a wide range of diseases affecting the urinary tract.

A urologic service, which involves the diagnosis and treatment of inflammatory infections of the urethra, prostate, seminal vesicles and epididymis is also available. Opportunity is given for the careful study and treatment of urethritis and infections of the adjacent genitourinary tract.

Daily conferences for discussion of unusual clinical conditions, and weekly seminars are held regularly.

COURSES

M286f-w,w-s,s-su,su-f. Necropsy Service. (See Department of Pathology.)

M287f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. (See Department of Pathology.)

M304f,w,s,su. Surgery of the Genitourinary Organs. (See Department of Surgery.)

M319f,w,s,su. Urologic Diagnosis. Cystoscopic examination. Urography; both retrograde and excretory. History-taking and clinical examinations in diseases of the genitourinary tract. Seminar. Dr. Braasch, Dr. Thompson, Dr. Cook, Dr. Emmett, Dr. Pool, Dr. Greene.

M320f,w,s,su. Special Urologic Treatment. Including the study and treatment of acute and chronic infections of the genitourinary tract. Dr. Cook.

M321f,w,s,su. Transurethral Surgery. Including prostatic resection, manipulation of stones in the ureter, litholapaxy, sphincterotomy, electrocoagulation of tumors, etc. Dr. Thompson, Dr. Cook, Dr. Emmett, Dr. Pool, Dr. Greene.

In addition to the above, fellows majoring in urology may take work in biochemistry, clinical pathology, experimental physiology, and dermatology. For details, see these departments.

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GENERAL INFORMATION

HISTORICAL STATEMENT

The University of Minnesota was one of the first universities to confer a degree for a sequence of courses pertaining to medical technology. The first bulletin was published March 10, 1922, with the title *Courses in Medical Technology for Clinical and Laboratory Technicians.* The first graduate received her degree in March, 1923, and up to the present, 1947, there have been 726 graduates.

The course was organized under the direction of Dr. Richard Olding Beard. It has always consisted of four years of college work with credit given for practical work in the hospital laboratories during the fourth year. In the beginning the major part of the special training was obtained by taking courses in anatomy, physiology, pathology, and medicine. In 1929, the first program of rotation through the various laboratories was established. By 1932, the schedule provided for twelve months of full-time work in the laboratories which included four months in the X-ray laboratory. In September, 1938, the schedule was changed to an entire twelve months in the medical laboratories and an additional six months in the X-ray laboratory. In September, 1939, the training in X-ray technique was lengthened to nine months and made optional. The separate four-year course in X-Ray Technology leading to the degree, bachelor of science, was established under the direction of Dr. Rigler in April, 1943 and discontinued June, 1947.

After the retirement of Dr. Beard in 1925, the course was under the supervision of a special committee of representatives of the Graduate School and the Medical School of which Dr. William A. O'Brien was chairman. In May, 1940, Dr. Evans was appointed director of the Course in Medical Technology.

MEDICAL TECHNOLOGY

The Course in Medical Technology is four years in length and leads to the degree, bachelor of science. The first two years are spent in the College of Science, Literature, and the Arts. At the beginning of the third year the student transfers her registration to the Medical School. The entire fourth year of twelve months is spent in practical rotating service in the laboratories of the University of Minnesota Hospitals.

This course is a desirable preliminary to graduate work in hematology, bacteriology, or physiological chemistry, and has a general educational value in the biological sciences. For the woman planning to enter medicine it is an ideal preliminary training.

OPPORTUNITY FOR X-RAY TECHNOLOGY

Students satisfying the requirements of the Course in Medical Technology have the opportunity without further payment of fees to spend an additional six months of practical training in the X-ray laboratory of the University of Minnesota Hospitals. At the completion of this training the student will receive a certificate in X-Ray Technology.

TRAINING

MEDICAL TECHNOLOGY

A medical technologist is trained in the performance of various diagnostic procedures used by physicians. Her work includes hematology, urinalysis, bacteriology, serology, electrocardiography, basal metabolism, blood bank work, the preparation of tissues for

microscopic study, and the chemical analysis of blood and urine. This work requires intelligence, accuracy, and reliability of a high order. As a general rule, a student who has excelled in scientific subjects in high school will succeed in Medical Technology.

X-RAY TECHNOLOGY

This work includes photographic processing, the taking of X-ray films, assisting in the fluoroscopic examinations, and assisting in the administration of X-ray for therapy. The work is hard physically and requires accuracy and reliability of a high order.

EMPLOYMENT

The broad training obtained in these fields enables the graduate to qualify for positions requiring general or specialized laboratory experience in hospital laboratories, clinics, and physicians' offices. In larger hospitals where there are several technologists, one may be occupied principally or entirely with hematology, bacteriology, chemistry, or X-ray technique. For those who choose the combined course the added training in X-ray technique increases the opportunities of employment. There are opportunities for graduates with sufficient ability to work in research laboratories associated with larger clinics, foundations, and universities.

ADMISSION TO FRESHMAN CLASS

The requirements for admission to preprofessional work of this course of study are the same as those for admission to the College of Science, Literature, and the Arts. For complete information consult the *Bulletin of General Information.* Graduates of accredited high schools may enter at the beginning of any quarter, but the curricula outlined are based on entrance in the fall quarter. If a student enters at any other quarter, it may be necessary for her to attend summer sessions to make up the irregularities in her program.

Although no specific subjects are required, it is recommended that prospective students take mathematics, physics, chemistry, and at least two years of a language in high school.

ADMISSION WITH ADVANCED STANDING

Students from other colleges may transfer to the University of Minnesota to complete the course in Medical Technology. Courses which are the equivalent of those given at the University of Minnesota are accepted to satisfy the requirements for entrance to the Course in Medical Technology (see page 9). Transfer students with three or more years of college training elsewhere will be permitted to begin the senior year (12 months of practical training in the University Hospitals laboratories) as soon as the remaining required courses are completed. Because certain of these courses are offered only at the University, it is usually necessary for transfer students to spend one or more quarters in attendance before beginning the senior practical work. It is necessary for all students to earn at least 45 credits in residence at the University of Minnesota before they are eligible to receive a degree.

ADMISSION TO THE JUNIOR CLASS

The number of students accepted into the junior class each year will depend upon the number of places available in the laboratories for practical experience during the senior year.

Application for admission to the last two years must be made by all students, including those registered the first two years at the University of Minnesota. All applications

should be filed with the Office of Admissions and Records by June 5. Applications received after July 1 will be considered only if the class of that year is not complete. Selection of all students to be admitted is made only once a year—in July—and applicants are notified shortly thereafter.

The requirements for admission to the junior year are stated in the section on scholarship. However, those students who expect to complete these requirements before or during the following winter quarter must file their application by June 5. In some instances, students transferring from other colleges may be able to make up their deficiencies, such as in bacteriology and histology, by attending Summer Session classes. This would make them eligible for admission to the special medical technology courses as much as one year earlier than would be possible otherwise. It is strongly advised that transfer students ascertain their status by writing to the Director, Course in Medical Technology, University of Minnesota Hospitals, Minneapolis 14, before May 1 so that, if necessary, they may take courses during the Summer Session.

SCHOLARSHIP

Before admission to the Course in Medical Technology the student must have completed 90 credits including the required courses with a total of 90 honor points. For each five honor points in excess of one honor point per credit, the number 90 is diminished by one.

The requirements for graduation are the completion of all the required courses or their equivalent, the completion of the practical work, and a total of 180 credits and 180 honor points—an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, not including those received for practical work, the number 180 is diminished by one.)

DEGREES

Upon satisfactory completion of the prescribed course of study, the degree, bachelor of science, will be conferred by the Board of Regents. Students completing the course with an average of two honor points for each credit may graduate "with distinction" and those with an average of two and a half honor points for each credit may graduate with "high distinction."

FEES

For complete information about fees, expenses, residence, consult the *Bulletin of General Information.*

All University fees are subject to modification without notice.

During the first two years, the student is enrolled in the College of Science, Literature, and the Arts. The tuition for residents of the state of Minnesota is $30 each quarter, that is, $90 a year; for nonresidents, $75 each quarter, or $225 each year.

During the junior and senior years after admittance to the Course in Medical Technology the tuition is $42 each quarter for residents and $90 each quarter for nonresidents. During the fourth year the student is given instruction and training for four quarters (twelve months) but pays tuition for only three quarters. No tuition is charged for the six months of practical training in X ray when it is taken in conjunction with the Course in Medical Technology.

In addition there is a matriculation deposit of $5 payable with the first registration only, and an incidental fee of $10.65 a quarter for which the student receives privileges such as the Health Service, Testing Bureau, Coffman Memorial Union, University post-

office service, and the *Minnesota Daily* including the Official Daily Bulletin. Laboratory deposits are required from students taking science courses.

Medical Technology students do not live in the hospital, nor are they supplied with books, meals, or uniforms; these must be furnished by the students themselves.

EXPENSES

The average cost of room, board, and laundry is stated in the *Bulletin of General Information* as $640 a year. This does not include books, tuition, laboratory fees, clothes, or traveling expenses.

RESIDENCES

Comstock Hall, Sanford Hall, Meredith Hall, and the Cooperative Cottages are University owned and operated dormitories. Preferential treatment is given all applicants who are Minnesota residents. In addition to these facilities maintained by the University, there are numerous private rooming houses for women students. All of these are inspected and must meet minimum standards of operation set by the University.

It is inadvisable to make reservations for a room in a private dwelling before seeing the room. Several of the available vacancies should be seen before definite commitments are made.

Further information than that supplied here may be obtained by writing to the Director of the Student Housing Bureau, Room 202, Eddy Hall.

REGISTRATION

All prospective students are urged to consult advisers in the Medical Technology office, M-519, University Hospitals. This should be done in person if possible. Each new student will be assigned a special adviser in the Medical Technology office to whom she is requested to submit her registration for approval each quarter.

STUDENT AID

The University of Minnesota offers many opportunities to those students in need of financial assistance to meet the expenses of their education. The usual criteria by which the merits of requests for financial assistance are considered are scholastic record, financial need, character, and vocational promise in the student's chosen field.

The various types of financial aids are classified as loans, scholarships, prizes and awards, and opportunities for employment.

In addition to general university loan and scholarship funds, there are two funds especially for students in Medical Technology—the William A. O'Brien Scholarship Fund and the W. K. Kellogg Foundation Loan Fund. Applications for loans and scholarships should be made to the Bureau of Student Loans and Scholarships, 211 Eddy Hall. For the special medical technology loan fund, applications for assistance must be made to the Bureau, but it is recommended that the student requesting such assistance should first have a personal interview with the medical technology adviser, M-519, University Hospitals.

The University maintains an Employment Bureau for the purpose of helping both men and women students who seek work, and of developing, in all proper ways, opportunities for self-help. It should be pointed out that each of the first three years of the Course in Medical Technology includes several courses which require many hours of work in the laboratory, and it is advised that only students who are proficient in their studies should attempt to do part-time work. During the fourth year, the practical work requires as much time as a full-time position and no student should arrange for outside or part-time work that will interfere with such a program.

CURRICULUM

MEDICAL TECHNOLOGY

FRESHMAN AND SOPHOMORE YEARS

The following courses or their equivalents must be completed before the student will be admitted to the junior year:

Comp. 4-5-6, Freshman Composition (9 cred.)
or
Eng. A-B-C, Freshman English (15 cred.) or exemption from requirement
Inorg. Chem. 1-2, or 4-5, General Inorganic Chemistry (8 cred.)
Inorg. Chem. 11, Semimicro Qualitative Analysis (4 cred.)
Anal. Chem. 7, Quantitative Analysis (4 cred.)
Org. Chem. 61-62, Elementary Organic Chemistry (8 cred.)
Zool. 1-2-3, General Zoology (10 cred.)
Zool. 21, Histology (5 cred.)
Anat. 4, Elementary Anatomy (5 cred.)
Bact. 53, General Bacteriology (5 cred.)
or
Bact. 101, Medical Bacteriology (5 cred.)
Phys. 1-2-3, Introduction to Physical Sciences (9 cred.)
Electives. To make a total of 90 credits for the two years' work. There is no essential limitation to the subjects which may be taken as electives. However, it is advised that during the freshman and sophomore years the student elect introductory courses in the subjects which she expects to continue in the junior year. A program that includes scattered electives will not be approved.

Some of the above courses are offered only one quarter a year. Therefore, it is essential that the student's program be arranged in such a way as to include these in the proper quarter.

Suggested program:

FRESHMAN YEAR

Fall	*Winter*	*Spring*
English A or 4	English B or 5	English C or 6
Zoology 1	Zoology 2	Zoology 3
Inorganic Chemistry 1 or 4	Inorganic Chemistry 2 or 5	Inorganic Chemistry 11
Electives	Electives	Electives

SOPHOMORE YEAR

Fall	*Winter*	*Spring*
Analytical Chemistry 7	Bacteriology 53	Organic Chemistry 62
Physics 1	Physics 2	Physics 3
Zoology 21	Organic Chemistry 61	Anatomy 4
Electives	Electives	

NOTE: A certain number of students each year will be advised to carry a special accelerated program so that they may enter the senior year somewhat earlier than the above program would permit.

JUNIOR AND SENIOR YEARS

In order to meet the requirements for graduation, the following courses must be completed:

Physiol. 60, Human Physiology (6 cred.)
Physiol. Chem. 100-101, Physiological Chemistry (13 cred.)
Bact. 102, Medical Bacteriology (4 cred.)
Bact. 116, Immunity (3 cred.)
Zool. 51, Introductory Animal Parasitology (5 cred.)

Anat. 165, Hematology (4 cred.)
Med. Tech. 51-52, Introduction to Medical Technology, Lectures (cred. arranged)
Med. Tech. 61, Introduction to Medical Technology, Laboratory (cred. arranged)
Med. Tech. 101, Methods and Clinical Orientation
Med. Tech. 102, Senior Practical Work (45 cred.)
Electives to make a total of 180 credits for four years' work.

Suggested program:

JUNIOR YEAR

Fall	*Winter*	*Spring*
Physiological Chemistry 100	Physiological Chemistry 101	Physiology 60
Zoology 51	Bacteriology 116	Bacteriology 102
Medical Technology 51	Medical Technology 52	Medical Technology 61
Anatomy 165	Electives	Electives

SENIOR YEAR

Medical Technology 101
Medical Technology 102

Students are eligible to begin the year of practical training (Med. Tech. 102) as soon as they have completed all of the theoretical courses with the exception of Med. Tech. 101. The scholastic standing in the first three years determines the order in which students are assigned to the hospital laboratory for their practical training.

X-RAY TRAINING

Students taking the X-ray training in addition to laboratory training must complete all the requirements for Medical Technology and X-Ray 65. Students electing this training will be scheduled for X-Ray 65 at the time that assignments for hospital laboratory training are made.

SUGGESTED ELECTIVES FOR FRESHMAN, SOPHOMORE, AND JUNIOR YEARS

Anat. 166, Hematology
Anth. 40, 41, Introduction to Anthropology
Anth. 42, The Growth of Cultures
Astron. 11, Descriptive Astronomy
Bact. 114, Molds, Yeasts, and Actinomycetes
Bact. 120, Diseases of Animals Transmissible to Man
Bact. 124, Filterable Viruses
Bot. 12, Plants Useful to Man
Comp. 27-28-29, Advanced Writing
Draw. and Des. Geom. 41, 42, 43, Technical Drawing
Econ. 1, Industrial History
Econ. 6-7, Principles of Economics
Eng. 21-22-23, Introduction to Literature
Eng. 37-38-39, Twentieth-Century Literature
Fine Arts 1, 2, 3, Introduction to Art
Geog. 11, Human Geography
Geol. 8, Earth Features and Their Meaning
Hist. 1-2-3, Civilization of the Modern World
Hist. 4-5-6, English History
Hist. 17, Modern Economic and Social Problems
Hum. 1, 2, 3, Humanities in the Modern World
Hum. 21, 22, 23, Humanities in the United States
Lib. Meth. 1, Use of Books and Library
Lib. Meth. 79, Medical Reference
Math. 1, Higher Algebra
Math. 15-16, Elementary Mathematical Analysis
Mu. 31-32-33, Music Appreciation
P.H. 3, Personal Health

P.H. 50, Public and Personal Health
Phil. 1-2-3, Problems of Philosophy, Logic, Ethics
Phil. 20, Social Philosophy
Pol. Sci. 1-2-3, American Government and Politics
Pol. Sci. 7, Comparative European Governments
Pol. Sci. 25, World Politics
Psy. 1-2, General Psychology
Psy. 3, Psychology Applied to Daily Life
Soc. 1, Introduction to Sociology
Soc. 2, Individual and Minority Group Adjustment
Sp. 1-2-3, Fundamentals of Speech
Zool. 22, Comparative Anatomy
Zool. 75, Nature Study
Zool. 83, Introduction to Genetics and Eugenics

DESCRIPTION OF COURSES*

Other courses which are equivalent or more comprehensive may be substituted for the required courses. The *Combined Class Schedule* should be consulted for class hours.

ANATOMY (HUMAN)

4s. Elementary Anatomy. (5 cred.; no prereq.)

165.†§ Hematology. Normal and pathologic morphology of the blood, with special emphasis on the study of the blood from the standpoint of diagnosis and prognosis. (4 cred.; prereq. Zoology 21)

BACTERIOLOGY

53f,w,s,su.§ General Bacteriology. (5 cred.; prereq. 10 cred. in chem. and 4 cred. in bot. or zool.)

101w.†§ Medical Bacteriology. (5 credit.; jr., sr., grad.; prereq. Zool. 1-2-3 and 10 cred. in chem.)

102.†§ Medical Bacteriology. (4 cred.; jr., sr., grad.; prereq. 53 or 101)

116w,su. Immunity. (3 cred.; jr., sr., grad:; prereq. 53 or 101)

CHEMISTRY

INORGANIC CHEMISTRY

1f-2w.‡ General Inorganic Chemistry. (4 cred. per qtr.; no prereq.)

4f-5w.‡ General Inorganic Chemistry. (4 cred. per qtr.; prereq. entrance cred. in chem.)

11s.‡‡ Semimicro Qualitative Analysis. (4 cred.; prereq. 2 or 5)

ANALYTICAL CHEMISTRY

7f.‡ Quantitative Analysis. (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry)

ORGANIC CHEMISTRY

61w-62s.‡ Elementary Organic Chemistry. (8 cred.; prereq. Inorg. Chem. 11)

ENGLISH

Important note—No student may register for any course in Freshman English without taking a placement test. Assignment to a particular course in Freshman English will depend on the student's record in this placement test.

* A course is designated under a department, by a number and a letter. It has the same number in whatever quarter it is offered. The quarter is designated by letter (f, fall; w, winter; s, spring; su, summer).

1f-2w-3s indicates a three-quarter course continued through the year.

1f,w,s, indicates a one-quarter course repeated each quarter.

† These courses follow the curriculum of the Medical School.

‡ A fee of $2 per quarter is charged for this course. The student should purchase a $5 chemistry deposit card from the bursar in the Administration Building. No student will be assigned a desk in the laboratory until he presents this card. The $2 course fee, laboratory material, and breakage will be charged against this deposit.

§ Microscope required. Students may obtain use of microscope by purchasing microscope card from bursar. $6 card required for Anat. 165; $3 card for Bact. 53, 101, 102.

‡‡ A fee of $2.40 per quarter is charged for this course. The student should purchase a $5 chemistry deposit card from the bursar in the Administration Building. No student will be assigned a desk in the laboratory until he presents this card. The $2 course fee, laboratory material, and breakage will be charged against this deposit.

Freshman English is a 15-credit course consisting of 9 credits of literature and 6 credits of composition. Composition 4-5-6 is a 9-credit course in composition. Either course satisfies the requirement in English for graduation or for admission to the Senior College.

Af-Bw-Cs. Freshman English. (15 cred.; all; prereq. placement test)
4f-5w-6s. Freshman Composition. (9 cred.; all; prereq. placement test)

MEDICAL TECHNOLOGY

51f-52w. Introduction to Medical Technology. Lectures, discussions, and demonstrations on certain tests performed in the hospital laboratories, including a consideration of the principles on which the methods are based, and the significance of the results. (Open only to students already accepted in the Course in Medical Technology; hrs. and cred. per qtr. ar.)

61f,w,s.‡ Introduction to Medical Technology. Laboratory work based on the above. (Open only to students already accepted in the Course in Medical Technology; hrs. and cred. per qtr. ar.)

101f-w-s. Methods and Clinical Orientation. Lectures and discussions on laboratory procedures, comparison of methods, fine points of technique, preparation of materials, solutions, media, etc., the use of apparatus, and laboratory organization. Case histories and patients presented to illustrate the value and importance of laboratory work to clinical practice. (Open only to students taking Med. Tech. 102)

102f-w-s-su. Senior Practical Work. Extends throughout the entire twelve months of the year (four quarters). Practical laboratory experience in a rotating service through all the laboratories of either the University of Minnesota Hospitals, the Minneapolis General Hospital, or Ancker Hospital, St. Paul. It includes training and experience in hematology, blood chemistry, urinalysis, bacteriology, serology, basal metabolism, electrocardiography, histological technique, sputum examination, gastric analysis, and parasitology. (45 cred.) (Open only to students accepted in Course in Medical Technology and who have completed all the required courses with the exception of Medical Technology 101.)

PHYSICS

1f-2w-3s. Introduction to Physical Science. Lectures and experimental demonstrations of the principles underlying physical phenomena. (9 cred.; all; prereq. high school algebra and plane geometry)

PHYSIOLOGICAL CHEMISTRY

100f. Physiological Chemistry. (7 cred.; jr., sr.; prereq. Zool. 1-2-3, Org. Chem. 61-62, and Phys. 1-2-3)

101w. Physiological Chemistry. (6 cred.; jr., sr.; prereq. 100)

PHYSIOLOGY

60s. Human Physiology. (6 cred.; prereq. Anat. 4 and Physiol. Chem. 101)

‡ Microscope required. Students may obtain use of microscope by purchasing $3 microscope card from Bursar.

X-RAY TECHNOLOGY

65f-w-s-su. Senior Practical Work. Extends through consecutive period of six months. Practical experience in X-ray technique, including photographic processing, exposures, positioning, fluoroscopic assistance, reception of patients. Special lectures in X-ray physics and X-ray technique arranged throughout this period. (Open only to students who have completed requirements for degree in Medical Technology.)

ZOOLOGY

1f‡-2w‡-3s.‡ General Zoology. (10 cred.; all; no prereq.)
21f,su.‡ Histology. (5 cred.; soph., jr., sr.; prereq. 1-2-3)
51f.‡ Introductory Animal Parasitology. (5 cred.; jr., sr.; prereq. 1-2-3)

‡ A fee of $1.50 per quarter is charged for this course.

The Bulletin of the UNIVERSITY *of* MINNESOTA

School of Dentistry and Course
for Dental Hygienists
Announcement for the Years 1947-1949

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SCHOOL OF DENTISTRY
and
COURSE FOR DENTAL HYGIENISTS

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Sam W. Williams, D.D.S., Teaching Assistant in Oral Diagnosis

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William Lick, M.D., Assistant in Pathology
John Williams, M.B., Assistant in Pathology

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David Glick, Ph.D, Associate Professor of Physiological Chemistry
Charles Carr, Ph.D., Instructor in Physiological Chemistry

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SCHOOL OF DENTISTRY

GENERAL INFORMATION

The School of Dentistry is located in the Medical Sciences Building at Washington Avenue and Union Street Southeast, on the Main campus of the University of Minnesota. Its students are privileged to enjoy all the advantages which come from participation in the activities of a university composed of academic, scientific, and professional schools and colleges.

The Medical Sciences Building is unsurpassed in its arrangement and facilities for the teaching of dentistry. The lecture rooms, laboratories, and infirmary are furnished completely in all details with the most modern equipment that has been developed for the teaching of the science and practice of dentistry.

These facilities, together with a highly specialized teaching staff both in the medical science subjects and in dentistry, enable the student to enter upon the study of dentistry under very favorable conditions. Instruction is given by lectures, laboratory courses, demonstrations, and by clinical practice in the infirmary.

The four-year course in dentistry leading to the degree of doctor of dental surgery is open to both men and women. A predental course of two years of college work in arts and sciences lays the foundation for the required professional education. The importance of dentistry as a branch of the healing art and the rapid advances made in recent years have produced marked changes in the length and content of the courses of study contained in the present curriculum. Throughout the entire course the teaching is closely integrated with the medical sciences laboratories and the clinical and hospital facilities of the Medical School.

The School of Dentistry is no longer operating on the accelerated program and a freshman class is admitted only once a year, in the fall.

APPLICATION PROCEDURE

Application forms may be secured from the Office of Admissions and Records, University of Minnesota, Minneapolis, and applications from nonresidents of Minnesota must be accompanied by a $5 credential examination fee. This fee is not refundable, but if the applicant enrolls within one year following the date of application, the $5 will be credited to his tuition for the first quarter. Remittance should be in the form of check, bank draft, or money order, payable to the University of Minnesota. *Do not send cash.*

Applicants must present evidence not only that they have completed the courses necessary to fulfill the entrance requirements but also that their college work and general fitness for dentistry is of such character as to give promise that they have the ability to do work of high quality in the dental course.

REQUIREMENTS FOR ADMISSION

Requirements for entrance into the School of Dentistry at the University of Minnesota are two years or sixty semester hours of work in an accredited college of liberal arts. This work should include one year of English, one year of inorganic chemistry, one-half year of organic chemistry, one year of zoology, and one year of physics. The science courses must include both lecture and laboratory work. Certain other restrictions apply to individuals resident outside of Minnesota. Persons interested in applying are advised to see the current *General Information Bulletin* of the University for additional information.

At the University of Minnesota the predental requirements are met by the following two-year course of study, provided high school chemistry and high school algebra and plane geometry are presented for admission (if these are not presented, Chemistry 1-2-3 is required instead of Chemistry 4-5):

1. Zoology 1-2-3, ten quarter credits.
2. Chemistry 4-5, 11, Organic 61-62, twenty quarter credits.
3. Physics 1a-2a-3a, twelve quarter credits.
4. Freshman English A-B-C, fifteen quarter credits; or Freshman Composition 4-5-6, nine quarter credits.
5. Latin or a modern language (high school or college), drawing, economics, history, political science, psychology, and sociology are recommended as electives to make up a total of 90 quarter credits.

Those applicants whose predental work has been taken at institutions other than the University of Minnesota must present to the Board of Admissions certified credentials of both preparatory and college work showing the subjects completed, credits, and grades.

SEVEN-YEAR COURSE IN ARTS AND DENTISTRY LEADING TO THE DEGREES OF BACHELOR OF ARTS AND DOCTOR OF DENTAL SURGERY

During the first three years of this course, the student does his work in the College of Science, Literature, and the Arts, subject to the regulations of the college, and must secure at least 135 credits, with a scholarship average of C for all courses taken. At least 30 credits must be in Senior College courses. He must complete the requirements for admission to the Senior College (see *Science, Literature and Arts Bulletin*) and also the work in chemistry, physics, and zoology prescribed for admission to the School of Dentistry.

During his third year, the student elects work in this college, subject to the approval of the assistant dean for the Senior College. The work of the freshman and sophomore years in the School of Dentistry, exclusive of technical and practical work, when completed according to the standards required by that school, counts as the equivalent of the fourth year (45 credits of the Arts course).

ADMISSION TO ADVANCED STANDING

Students from other dental colleges whose standards are fully equivalent to those of this institution may be received into advanced classes. Such students must make formal application on the blank provided, and must submit credentials covering predental and dental studies. Such credentials must show that the student has completed the required predental subjects and has maintained the standard of scholarship required of students of this school.

Notebooks and other evidences of laboratory work must be presented. The amount of credit to be granted a student from another school is decided by the heads of the respective departments in conference with the Class Committee. Subject credit (but not legal time credit) may be given for studies pursued other than in dental schools.

Students desiring advanced standing in the University of Minnesota should have an official transcript of their record sent to the Office of Admissions and Records by the registrar of the college previously attended.

Graduates of foreign dental schools (except Canadian schools that are members of the American Association of Dental Schools) who wish to complete the requirements for the degree of doctor of dental surgery must present credentials showing the completion of the predental subjects for admission and then plan to spend two academic years in the School of Dentistry.

REQUIREMENTS FOR GRADUATION

A candidate for the degree of doctor of dental surgery, after satisfying all the requirements for admission to the School of Dentistry, must have complied with all the rules and regulations and completed the required curriculum and must have been recommended by the faculty of the School of Dentistry for the degree of doctor of dental surgery.

FEES

Tuition fee (per quarter)	
Residents of Minnesota	$ 75.00
Nonresidents	120.00
Clock hour tuition fee (unclassed students, auditors, and others carrying less than full work):	
Residents of Minnesota	6.25
Nonresidents	10.00
Matriculation deposit* (first quarter only)	5.00
Incidental fee‡ (per quarter)	10.65
Graduation fee	7.50
Special fees:	
Credential examination fee (applicable to nonresidents)	5.00
Examination on subjects taken out of class§	5.00

(No fee for such examination on first entering the University, if taken within the first six weeks.)

Laboratory fees for individual courses. The amounts are specified in the course announcements.

Privilege fees.—The fee for the privilege of late registrations or late payment of fees is $2 through the third day of classes. On the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5. The fee for late change of registration is $2.

DENTAL EQUIPMENT AND BOOKS

Students are required to provide themselves with the instruments and textbooks specified in the *Official List* which may be secured upon request.

Dental instruments and equipment are not offered for sale by the University but may be purchased from regular dealers in dental supplies located near the campus. Books may be obtained from the Professional Colleges Bookstore in the Main Engineering Building or from nearby dealers.

The approximate costs of dental instruments and books are as follows:

	Instruments	Books
Freshman year, estimate	$233.00	$70.50
Sophomore year, estimate	395.00	46.75
Junior year, estimate	51.00	45.50

LOAN FUNDS

The University of Minnesota has numerous loan funds. They are restricted in their distribution to individuals meeting certain requirements. A loan usually cannot be obtained before two quarters of attendance at the University, during which time the student will have the opportunity to demonstrate his ability and integrity. The only security for the loans made to students is the character of the applicant and

* Such charges as may be incurred for lockers, library penalties, laboratory breakage, etc., will be deducted from the amount of this deposit and the balance will be refunded by mail upon graduation or after the beginning of the first quarter the student fails to return to the University.

‡ An incidental fee of $10.65 a quarter is charged each student for which the student receives privileges such as the Coffman Memorial Union, the Health Service, the Testing Bureau, the *Minnesota Daily* including the Official Daily Bulletin, and the university post-office service.

§ Such an examination may be taken only upon approval of the appropriate committee.

his ability to do college work. Application for loans may be made to the Bureau of Student Loans and Scholarships, 207 Eddy Hall, a department under the office of the dean of students.

SELF-SUPPORT

The University Employment Bureau, Room 17, Administration Building, efficiently assists students who find it necessary to earn part or all of their expenses. However, the regular course in dentistry is a full program and students find it difficult to devote many hours a week to outside employment.

STUDENTS' HEALTH SERVICE

Through the Students' Health Service the University makes available to students medical care, medical examinations, and health consultations. General service is provided free of charge, but for services which are specialized and individual in character, such as dentistry, X-ray, board and laundry in the student hospital, outpatient calls, minor surgery, etc., special fees are charged. No student, however, will be denied service because of inability to pay these fees. Major surgical operations or prolonged medical care ordinarily are secured through private physicians selected by the students or their families, but, if necessary, operations may be arranged through the Students' Health Service upon the established basis.

LIBRARY

The University of Minnesota Library is one of the finest libraries in existence today. It includes about 1,000,000 volumes and many periodicals and pamphlets and in scope takes in every subject in the university curriculum. Its large, airy reading rooms provide an excellent place to study.

The Biological-Medical Room occupies the north end of the second floor of the library and will accommodate 216 readers. It includes the former college and departmental libraries in Animal Biology (Zoology), Botany, Dentistry, Medicine, Pediatrics, and much of Pharmacy. Reference books, texts, and treatises of various kinds are kept on open shelves in this room. This section includes all available literature on dentistry in book and periodical form and additional volumes are purchased as soon as they have been recommended by the Library Committee of the faculty in dentistry. These library facilities offer the student an excellent opportunity to secure a knowledge of the science and practice of dentistry.

Also, in the Medical Sciences Building in connection with the offices of the various divisions adjacent to lecture rooms, laboratories, and the clinic of the School of Dentistry are located reference reading books and periodicals for the use of students.

COFFMAN MEMORIAL UNION

The Coffman Memorial Union places Minnesota in the forefront of American universities as to the recreational facilities which it offers to students. The student post office, cafeterias and lunch rooms, committee dining rooms, lounges for men and women, game rooms, bowling alleys, pool and billiard rooms, offices for student organizations, barber shop, beauty parlor, library, art room, and spacious ballroom are among the features that make the building the popular center of campus life.

HONOR FRATERNITY

Omicron Kappa Upsilon, the national honor dental fraternity, is represented at Minnesota by the Beta Beta Chapter. Students are elected to membership in the senior year by the faculty on the basis of scholarship, character, and conduct during their course. Not more than 12 per cent of the class is eligible.

GRADUATE WORK IN DENTISTRY

Graduate work for a limited number of properly prepared students is offered in certain fields of dental research and dental specialties. The work is under the direction of a joint committee in dentistry and medicine in the Graduate School. Candidates for admission must be graduates of an acceptable dental school with at least two years of preliminary general college work. They must also present or acquire sufficient training in the basic sciences, such as bacteriology, anatomy, pathology, physiology, and physiological chemistry, to enable them to apply these disciplines to research on some of the problems facing dentistry as one of the health sciences. The minimum training to meet this requirement at the University of Minnesota is in general the equivalent of that required of graduate students in the fields of clinical medicine. The basic science courses necessary as a foundation for advanced study are outlined under the departmental offerings in the *Graduate School Bulletin*. Altho a reading knowledge of German is recommended as highly desirable, candidates for the Master's degree in dentistry are exempt from the foreign language requirement. Qualified students who give full time to their studies and absolve the requirements, including a satisfactory thesis, will normally require three years for the degree of master of science in dentistry.

The fields of research and specialization in which work will be directed are: oral pathology, oral surgery, orthodontia, periodontia, and restorative dentistry.

PRACTITIONERS' COURSES

In order to enlarge its educational field and to fill a need that has found expression among practitioners, the School of Dentistry offers, from time to time, a series of courses in crown and bridge work, denture prothesis, operative dentistry, oral diagnosis, oral hygiene, oral surgery, orthodontia, periodontia, and similar subjects. Announcements regarding these refresher courses are published in the dental journals and in some cases notices are mailed directly to practitioners.

The School of Dentistry also offers an opportunity for dentists to register for clinical courses in restorative dentistry during the school year. These courses extend over a period of from one or two weeks to an entire term and include crown and bridge work, denture prothesis, operative dentistry, oral diagnosis, and periodontia.

For further details call or write the dean's office, School of Dentistry.

FOUR-YEAR COURSE OF STUDY IN THE SCHOOL OF DENTISTRY

	First Quarter		Second Quarter		Third Quarter		Total	
	Cred.	Hrs.	Cred.	Hrs.	Cred.	Hrs.	Cred.	Hrs.
Freshman Year								
Oral Anatomy	2	40	2	40	3	70	7	150
Prosthetics laboratory	3	70	4	100	4	100	11	270
Gross Anatomy								
Systemic	6	120	.....	.....	.....	.....	6	120
Head and Neck	.....	.....	.....	.....	6	120	6	120
Microscopic Anatomy	.....	.....	8	160	.....	.....	8	160
Physiological Chemistry	5	50	4	80	.....	.....	9	130
Bacteriology	.....	.....	.....	.....	5	90	5	90
	16	280	18	380	18	380	52	1040

	First Quarter		Second Quarter		Third Quarter		Total	
	Cred.	Hrs.	Cred.	Hrs.	Cred.	Hrs.	Cred.	Hrs.
Sophomore Year								
Pathology	7	130	.....	.....	.....	.....	7	130
Physiology	.....	.....	5	70	5	70	10	140
Prosthetics Laboratory	3	70	.....	.....	.....	.....	3	70
Prosthetics Clinic	.....	.....	3	90	3	90	6	180
Operative Laboratory	5	130	4	100	.....	.....	9	230
Operative Clinic	.....	.....	.....	.....	3	80	3	80
Operative Lecture	.....	.....	.....	.....	1	10	1	10
Oral Histology and Pathology	.....	.....	2	20	1	10	3	30
Dental Writing—Dental Health	.....	.....	.....	.....	1	10	1	10
Radiology	.....	.....	.....	.....	1	10	1	10
Crown and Bridge Laboratory	.....	.....	4	100	4	100	8	200
	15	330	18	380	19	380	52	1090
Junior Year								
Pharmacology	2	20	6	100	.....	.....	8	120
Crown and Bridge Laboratory	4	100	.....	.....	.....	.....	4	100
Crown and Bridge Lecture	.....	.....	.....	.....	1	10	1	10
Crown and Bridge Clinic	.....	.....	2	60	2	60	4	120
Operative Lecture	1	10	.....	.....	1	10	2	20
Operative Clinic	4	120	3	90	3	90	10	300
Prosthetics Lecture	.....	.....	1	10	1	10	2	20
Prosthetics Clinic	2	60	2	60	2	60	6	180
Periodontia Lecture	.....	.....	1	10	.....	.....	1	10
Periodontia Clinic	.....	.....	1	30	1	30	2	60
Orthodontia Laboratory	.....	.....	2	40	.....	.....	2	40
Orthodontia Lecture	.....	.....	.....	.....	1	10	1	10
Orthodontia Clinic	.....	.....	.....	.....	1	30	1	30
Pedodontics Lecture	1	10	.....	.....	.....	.....	1	10
Pedodontics Clinic	.....	.....	.....	.....	1	30	1	30
Radiology Clerkship	.....	.....	.....	.....	1	30	1	30
Oral Diagnosis	1	10	.....	.....	.....	.....	1	10
Metallurgy	2	20	.....	.....	.....	.....	2	20
Oral Medicine	.....	.....	1	10	1	10	2	20
Oral Surgery	.....	.....	.....	.....	2	20	2	20
	17	350	19	410	18	400	54	1160
Senior Year								
Operative Lecture	1	10	.....	.....	1	10	2	20
Operative Clinic	3	90	3	90	3	90	9	270
Prosthetics Lecture	1	10	.....	.....	.....	.....	1	10
Prosthetics Clinic	2	60	2	60	2	60	6	180
Crown and Bridge Lecture	1	10	1	10	1	10	3	30
Crown and Bridge Clinic	2	60	2	60	3	90	7	210
Orthodontia Lecture	1	10	1	10	1	10	3	30
Orthodontia Clinic	2	60	2	60	1	30	5	150
Oral Surgery Lecture	1	10	2	20	1	10	4	40
Oral Surgery Clinic	.....	20	.....	20	2	20	2	60
Oral Diagnosis Seminar	1	10	.....	.....	.....	.....	1	10
Oral Diagnosis Clerkship	.....	.....	1	30	.....	.....	1	30
Periodontia Lecture	1	10	.....	.....	.....	.....	1	10
Periodontia Clinic	1	30	.....	.....	.....	.....	1	30
Pedodontics Lecture	.....	.....	1	10	.....	.....	1	10
Pedodontics Clinic	1	30	1	30	.....	.....	2	60
	18	420	16	400	15	330	49	1150

DESCRIPTION OF COURSES

ANATOMY

59. Systematic Anatomy. A comprehensive treatment of the various organ systems of the human body. Lectures, recitations and laboratory work. 120 hours, 6 credits. Offered to freshmen. Prerequisite: Zoology 1-2-3. Enrolment limited to 90 students. Dr. Hartmann and assistants.

60. Anatomy of the Head and Neck. Detailed dissection of the human head and neck with correlative treatment of the upper extremity. 120 hours, 6 credits. Offered to freshmen. Prerequisites: Zoology 1-2-3, Anatomy 59. Enrolment limited to 90 students. Dr. Hartmann and assistants.

61.‡ Histology and Embryology. Minute structure and development of the tissues and organs of the body, with special emphasis upon the teeth and digestive tract. Lectures, recitations, and laboratory work. 160 hours. 8 credits. Offered to freshmen. Prerequisites: Zoology 1-2-3, Anatomy 59. Enrolment limited to 90 students. Dr. Rasmussen and assistants.

BACTERIOLOGY AND IMMUNOLOGY

52. Dental Bacteriology. Morphology; methods of staining; culture media; methods of identification; principles of sterilization and disinfection; concept of infection; pathogenic bacteria; the oral flora; bacteriology of the stomatitides, dental caries, alveolar abscess, and pyorrhea; systemic infections secondary to bacterial diseases of the mouth and teeth. 90 hours. 5 credits. Offered to freshmen. Dr. Green and staff.

DENTISTRY

Courses numbered from 50 through 59 are freshman courses; those from 60 through 69 are sophomore courses, those from 80 through 89 are junior courses; and those from 90 through 99 are senior courses.

DIVISION OF CROWN AND BRIDGE WORK

60-61-62. Crown and Bridge Work. A technic course. Lectures, demonstrations and laboratory work including the construction of typical cases such as: a lower hygienic bridge, an upper posterior bridge, an upper anterior bridge, a Richmond and a Davis crown. A lecture immediately precedes each new laboratory technic and an illustrated syllabus aids the students in carrying out each piece of work. 200 laboratory and lecture hours. 8 credits. Prerequisite: Oral Anatomy 50-51-52. Dr. Thom and staff.

80-81-82. Crown and Bridge Work. An advanced technic course combined with clinical practice and the simpler forms of restorations. The laboratory work includes the important forms of the lower anterior bridge, porcelain jacket crown, and three preparations on natural teeth. 230 laboratory, lecture, and clinical hours. 9 credits. Prerequisite: Crown and Bridge Work 61-62. Dr. Thom and staff.

90-91-92. Crown and Bridge Work. A clinical course. Lectures, demonstrations, and clinical practice. Lectures on types of bridge attachments, full mouth restorations, opening the bite, balanced occlusion, and diagnosis, featuring the various adaptations of familiar technics to complex cases of fixed and removable bridge work. Lectures, demonstrations, and clinical practice in ceramics,

‡ Microscope required. Students (except medical) may obtain use of microscope by purchasing $6.00 microscope card from bursar.

including porcelain inlays and porcelain jacket crowns. 240 clinical and lecture hours. 10 credits. Prerequisite: Crown and Bridge Work 80-81-82. Dr. Thom and staff.

DIVISION OF DENTURE PROSTHESIS

50-51-52. Denture Prosthesis. A course of lectures, recitations, demonstrations, and laboratory technic covering the various phases of complete and partial denture prosthesis, materials used, their properties and manipulations; fundamental principles of denture retention, anatomic occlusion and articulation, and esthetics. 270 laboratory and lecture hours. 11 credits. Dr. Damon and staff.

60. Denture Prosthesis. A continuation of the course in Denture Prosthesis. Laboratory technic consists of construction of partial dentures with special attention devoted to the cast partial denture. 70 laboratory hours. 3 credits. Prerequisite: Denture Prosthesis 50-51-52. Dr. Damon and staff.

61. Denture Prosthesis. A course of demonstrations in the subject of complete dentures, preparatory to clinical practice. 90 clinical hours. 3 credits. Prerequisite: Denture Prosthesis 60. Dr. Flagstad and staff.

62. Denture Prosthesis. A course in the clinical practice of denture prosthesis. 90 clinical hours. 3 credits. Prerequisite: Denture Prosthesis 61. Dr. Flagstad and staff.

80-81-82. Denture Prosthesis. A course of lectures and clinical practice in the various types of artificial denture service, including complete dentures and partial dentures. 200 lecture and clinical hours. 8 credits. Prerequisite: Denture Prosthesis 60, 61, 62. Dr. Flagstad and staff.

90-91-92. Denture Prosthesis. A course of lectures and clinical practice continuing the work of the junior year and in addition presenting material on restorations for abnormal conditions. 190 clinical and lecture hours. 7 credits. Prerequisite: Denture Prosthesis 80-81-82. Dr. Flagstad and staff.

DIVISION OF PEDODONTICS

80. Pedodontics. A course of lectures covering diagnosis, differential anatomy, deciduous and permanent teeth, growth and development, cavity preparation on deciduous and young permanent teeth, caries prevention. 10 lecture hours. 1 credit. Dr. Wittich.

82. Pedodontics. A course in cavity preparation and insertion of fillings in deciduous teeth. 30 clinical hours. 1 credit. Dr. Wittich.

90,91,92. A course of lectures covering advanced cavity preparation in deciduous teeth and young permanent teeth, treatment of pulp of deciduous teeth, restoration of fractured young permanent anterior teeth, space maintainers, preventive orthodontia and treatment with sodium fluoride. Advanced clinical work in cavity preparation and filling of deciduous and young permanent teeth, treatment of fractured permanent anterior teeth, pulpotomies in deciduous and permanent teeth, practical space maintainer case. 70 lecture and clinical hours. 3 credits. Dr. Wittich.

DIVISION OF OPERATIVE DENTISTRY

60-61-62. Operative Dentistry. A technic course in the principles of cavity preparation, characteristics and manipulation of filling materials both of the plastic and nonplastic types and adjuncts used therewith. Special stress is devoted to familiarizing students with instruments and their care and accessories and equipment pertaining to clinical procedures. Lectures, restorations, and special individual demonstrations to students. Upon the satisfactory completion of the

technic work, the student progresses into work in the clinic. 320 laboratory, lecture, and clinical hours. 13 credits. Prerequisite: Oral Anatomy 50-51-52. Dr. Green and staff.

80-81-82. Operative Dentistry. Introductory course in clinical operative dentistry. The care of patients, diagnosis, prophylaxis, use of rubber dam, separating devices, and other accessories. This course includes clinical work for both children and adults. Pulp pathology and root canal therapy and a study of the medicines used in the clinic. 320 lecture and clinical hours. 12 credits. Prerequisites: Operative Dentistry 60-61-62 and Histology and Embryology 61. Dr. Green and staff.

90-91-92. Operative Dentistry. A clinical course including the more comprehensive principles and advanced technics of operative procedure. A study of full mouth restoration for present and anticipated needs. An appreciation of hereditary influences, abnormal developments, physiological functions and pathogenic disturbances, caries, erosion, and tooth dyscrasias. Extended experience in the technical use of materials and medicines, and a study of their values in protecting and maintaining the health of oral structures. Theses, group demonstrations, and supervised clinical practice. Pulp pathology and root canal therapy comprise an important branch of study. 290 lecture and clinical hours. 11 credits. Prerequisite: Operative Dentistry 80-81-82. Dr. Green and staff.

DIVISION OF ORAL ANATOMY

50-51-52. Oral Anatomy. A course of lectures, recitations, demonstrations, and laboratory technic. Nomenclature, definition, spelling, pronunciation, derivation, abbreviations, differentiation and method of combining terms. A study of deciduous and permanent teeth, individually and as working units. The subject of occlusion is studied in minute detail. The function of tooth form and its practical application is stressed throughout the course. The laboratory phase includes projects in drawing, modeling, carving and sectioning natural teeth. 150 laboratory and lecture hours. 7 credits. Dr. Hall and staff.

DIVISION OF ORAL DIAGNOSIS AND RADIOLOGY

62. Dental Radiology. A series of lectures and demonstrations on the application of Roentgen rays for dental diagnostic purposes. The course includes the electrophysics of the apparatus, positioning of the films, angulation of the machine, and processing. 10 lecture hours. 1 credit. Dr. Williams.

82. Radiology Clerkship. During the junior year the student will serve a regular clerkship in the department of radiology taking, processing, and mounting dental X rays. Concurrent with the clerkship, there will be arranged a conference course for small groups of students in which the radiograph of clinical patients are read and interpreted. 30 clinical hours. 1 credit. Dr. Knight.

80. Oral Diagnosis. A lecture course covering a study of oral examinations, methods of investigation, and the recording of clinical data. 10 lecture hours. 1 credit. Dr. Simon.

81. Oral Medicine. A study of the oral manifestations of systemic and local diseases. Small group conferences on laboratory procedures for diagnostic purposes will be arranged during the winter and spring quarters for junior students. 10 lecture hours. 1 credit. Dr. Wahlquist.

82. Oral Medicine. A study of the general diagnosis and methods of investigation related to the clinical and fundamental problems of medicine and dentistry. 10 lecture hours. 1 credit. Dr. Wahlquist.

91. Oral Diagnosis Clerkship and Seminar. The student will serve as a clerk of admissions in the Division of Oral Diagnosis. Hours are arranged. During the fall quarter of the senior year a seminar of 10 lectures will be presented by selected members of the faculty. 2 credits. Dr. Simon.

DIVISION OF ORAL HYGIENE AND PATHOLOGY

63. Dental Writing—Dental Health. Lectures covering two series of topics: (a) Use of dental libaries and writing of dental papers. (b) Health and diseases of the dental supporting structures, including oral hygiene technique. 10 lecture hours. 1 credit. Dr. Radusch.

60-61-62. Oral Histology and Pathology. A course of lectures covering the subject of the histology of the teeth and related oral tissues. Adequate embryologic considerations are included. Also lectures dealing with the special pathology of the oral region. Emphasis is placed on the relation of local pathologic findings to systemic conditions and to general pathology. The course is supplemented by outside reading and thesis, by laboratory studies and drawings, and by clinical demonstrations. 30 lecture hours. 3 credits. Prerequisites: Bacteriology and Pathology. Dr. Worman.

81-82. Periodontia. A lecture, demonstration, and clinical course in the causes, treatment, and prevention of gingivitis, dental periclasia, and other diseases of the investing tissues. Special attention is paid to diagnosis and its systematic complications. 70 lecture and clinical hours. 3 credits. Prerequisite: Operative Dentistry 60-61-62. Dr. Johnson and staff.

90-91. Periodontia. A continuation of the study of the causes, treatment, and prevention of periodontal lesions. 40 lecture and clinical hours. 2 credits. Dr. Johnson and staff.

DIVISION OF ORAL SURGERY

81. Oral Surgery. (Anesthesia.) Lecture course on local and general anesthesia. 10 hours. 1 credit. Dr. Clark and staff.

82. Oral Surgery. (Principles of Exodontia.) Lecture course introducing the student to the principles and practice of minor oral surgery of the oral cavity. Indications for tooth removal, technic of tooth extraction, precautions against accident, and attention to postoperative care. 10 hours. 1 credit. Dr. Clark and staff.

90,91,92. Oral Surgery. Lecture course in fractures of the jaws, tumors, infections, cysts, congenital malformations, functional diseases, and other surgical conditions of the oral cavity and associated structures. Clinics arranged. 60 lecture and clinical hours. 4 credits. Dr. Clark and staff.

93-94. Oral Surgery. (Advanced Exodontia.) Lecture course in technic of removal of impacted and unerupted teeth, alveolectomy, curettage of granulomas, and tooth removals in children and the aged. Special considerations in removal of teeth under gas anesthesia. Clinics arranged. 40 lecture and clinical hours. 2 credits. Dr. Clark and staff.

DIVISION OF ORTHODONTIA

81. Orthodontia. A technic course of lectures, demonstrations, and laboratory work including soldering, band forming, and the drawing and making of regulating and retaining appliances. 40 lecture and laboratory hours. 2 credits. Prerequisite: Oral Anatomy 50-51-52. Dr. Rudolph and staff.

82. Orthodontia. A course of lectures, recitations, demonstrations, and clinical work in which students are required to treat one or more of the simpler cases of irregularities of the teeth. 40 lecture and clinical hours. 2 credits. Prerequisite: Orthodontia 81. Dr. Rudolph and staff.

90-91-92. Orthodontia. An advanced course continuing the work offered in the junior year and which deals with the causes and treatment of irregularities of the teeth and the methods of treatment. 180 lecture and clinical hours. 8 credits. Dr. Rudolph and staff.

METALLOGRAPHY

159. Dental Metallography. Lectures, recitations, and demonstrations, taking up the most important metals with special reference to those used in dentistry and the study of dental alloys from the standpoint of metallography. 20 hours. 2 credits. Drs. Dowdell, Jerabek, Mr. Mackay.

PATHOLOGY

104.‡ General and Special Pathology. Circulatory disturbances, metabolic change in cells and tissues, pigment deposits, inflammations and tumors. Pathology of selected diseases, tumors, and lesions affecting the mouth and dental structures. Exercise in gross and microscopic diagnosis. 130 hours. 7 credits. Prerequisites: Anatomy 59, 61. Dr. Clawson and assistants.

PHARMACOLOGY

53. Introduction to Dental Pharmacology. 11 lecture hours. 1 credit. Offered to junior dental students. Prerequisites: Physiological Chemistry 57, 100 and Physiology 58-59. Drs. Bieter, Wright, and assistants.

54. Dental Pharmacology. The history, origin, nature, pharmacal preparations, and use of drugs, including the discussion of their physiologic, pharmacologic, and therapeutic actions. Also laboratory exercises upon the chemical composition and mode of action of typical drugs upon man and animals, primarily for students in dentistry. 100 laboratory and lecture hours. 6 credits. Prerequisites: Physiological Chemistry 57, 100 and Physiology 58-59. Drs. Bieter, Wright, and assistants.

55. Prescription Writing. A course dealing with the essentials of prescription writting with special reference to the drugs used in dental practice and the requirements of federal and state legislation. 11 hours. 1 credit. Prerequisites: Pharmacology 53, 54. Drs. Bieter, Wright.

PHYSIOLOGY

58-59. Human Physiology. Course in the principles of physiology for dental students and others. Physiology of cells, muscle, nerve, central nervous system, senses, blood, circulation, respiration, digestion, metabolism, endocrines, excretion. 140 hours. 10 credits. Prerequisites: Zoology and Physiological Chemistry 57, 100. Dr. King and others.

PHYSIOLOGICAL CHEMISTRY

57. Physiological Chemistry. Intermediary metabolism, excretion, endocrinology, and special topics related to dental biochemistry. 80 laboratory and lecture hours. 4 credits. Dr. Glick and others.

‡ Microscope required. Students (except medical) may obtain use of microscope by purchasing $6.00 microscope card from bursar.

100.‡‡ Physiological Chemistry. For dental students and others. Prerequisites, organic and physical chemistry and physics. 50 laboratory and lecture hours. 5 credits. Dr. Armstrong and staff.

GRADUATE COURSES

203-204-205. Pharmacology. For graduate and advanced students. Hours and credits arranged. Drs. Bieter, Wright.

204-205-206. Oral Pathology. Problems in dental caries. The facilities of the School of Dentistry, in co-operation with the various departments of the Medical School, are available for investigation of the fundamental problems relating to the teeth and their investing tissues. The work will form a basis for the study of dental diseases in general and of dental caries in particular. 9 credits (or more). Dr. Simon and staff.

207-208-209. Oral Surgery. The work will consist of laboratory and clinical training in the fundamentals of surgical oral pathology, surgical diagnosis and treatment of injuries, infections, tumors, and abnormalities of the jaws and associated parts. The clinical work will be given at the School of Dentistry, the University of Minnesota Hospitals, and other hospitals. The major assignment will include a specific problem in oral surgery, for which the facilities of the research laboratories of the School of Dentistry, as well as those of the Medical School, will be available. 9 credits (or more). Dr. Clark and staff.

210-211-212. Orthodontia. A course of lectures, seminars, demonstrations, and clinical work in the diagnosis and treatment of malocclusion of the teeth. Its aim is to prepare graduate students for the specialty of orthodontia. 9 credits (or more). Dr. Rudolph and staff.

213-214-215. Periodontia. Lectures, demonstrations, and clinical study of mouth infections, especially periodontoclasia. Methods of prevention as well as treatment, and the relationship of dietary deficiencies will be included. 9 credits (or more). Dr. Johnson and staff.

216-217-218. Restorative Dentistry. The restoration of teeth to normal function and occlusion, and the replacement of missing teeth by fixed or removable bridge work and dentures. A study of the various materials and their manipulation as used in restorations. 9 credits (or more). Dr. Flagstad and staff.

‡‡ The student must purchase a $5 physiological chemistry card from the bursar in the Administration Building. No student will be assigned a desk in the laboratory until he presents this card. The cost of special chemicals, nonreturnable equipment, and breakage will be charged against the deposit.

COURSE FOR DENTAL HYGIENISTS

GENERAL INFORMATION

PURPOSE

The Course for Dental Hygienists is established to fill the need for workers in the public schools, hospitals, industrial institutions and dental offices to do dental prophylactic work and to teach hygiene of the mouth. This type of preventive work is recognized as being one of the great physical needs of our modern times. A thoro scientific training and cultural background, as is possible in the two-year course, is aimed to give the student a professional education and point of view to work in the semi-independent capacity the nature of her work demands. The course also includes training in dental assisting and laboratory work and should make the graduate easily adaptable to the general duties of the private dental office should that be the field of work selected.

The course requires two academic years of study and leads to the degree of graduate dental hygienist (G.D.H). The incorporation of this work in the University makes it possible to teach all of the subjects of the curriculum in the appropriate departments, thus assuring the student of a university contact, and instructions under the best auspices.

The first year's work deals with preliminary science courses and dental technic, and corresponds to some extent with the one-year course given at other schools. The second year is designed to prepare the student for dental prophylactic service in dental offices and the teaching of mouth hygiene in health departments and schools. The dental hygienist must be able to take an active part in oral hygiene work with the public.

After graduation a dental hygienist secures a license to practice by passing the state dental examination required by the state in which she desires to locate. In all instances she practices under the supervision of a licensed dentist or director of a public health program.

ADMISSION

Students are admitted only at the opening of each fall term.

Special requirements—Applicants for admission to the Course for Dental Hygienists must be young women between eighteen and thirty-five years of age. She must be able to pass a satisfactory general physical examination given by the Students' Health Service. One year of high school typing is advantageous.

General requirements—The University requires for admission into this area, graduation from an approved high school or other preparatory school on the accredited list. (See the *Bulletin of General Information* for a complete statement of admission requirements, rulings applicable to nonresidents, etc.)

Because of the specialized work in dental hygiene all applicants are urgently requested to consult the dean of the School of Dentistry before registration.

ADVANCED STANDING

Students with advanced standing, who enter the Course for Dental Hygienists, should consult the dean of the School of Dentistry when planning their programs. A minimum load of thirteen credits is required each quarter in dental hygiene. Two academic years of study is required for completing the course for dental hygienists.

ARTS AND DENTAL HYGIENE

A course leading to the degrees of graduate dental hygienist and bachelor of arts may be arranged by consulting the dean of the College of Science, Literature, and the Arts.

APPLICATION PROCEDURE

All inquiries, credentials, and applications for admission to the undergraduate colleges should be addressed to the Office of Admissions and Records, University of Minnesota, Minneapolis 14, Minnesota.

Application blanks may be obtained at any Minnesota high school or from the Office of Admissions and Records of the University of Minnesota.

An admission certificate will be mailed to each student who has met the requirements. Students entering from other colleges or universities will also receive a statement of advanced standing. Instructions for registration will either be enclosed with the admission certificate or will be mailed later—about one month before the opening of the quarter. Students must present their admisison certificates when they report for registration.

FEES

Tuition fee (per quarter)	
Residents of Minnesota	$30.00
Nonresidents	75.00
Matriculation deposit‡ (first quarter only)	5.00
Incidental fee‡‡ (per quarter)	10.65
Graduation fee	7.50
Special fees:	
Examination for credit (after first six weeks in residence)	5.00
Special examination*	5.00

Additional course fees as indicated in course description.

Privilege fees.—The fee for the privilege of late registration or late payment of fees is $2 through the third day of classes. On the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5. The fee for late change of registration is $2.

Part-time fees.—Students not registered for the full course will be charged tuition at the rate of $2.50 per credit for residents; $6.25 for nonresidents.

EQUIPMENT

The University will furnish the larger pieces of equipment needed for the work in the clinic and laboratories, but the student must furnish her own uniforms, caps, white shoes and laboratory and operating instruments, textbooks and supplies. These instruments and supplies will be needed during the first year and will cost approximately $75. Lists of required materials are mailed to new students.

PRIZES

Alpha Kappa Gamma prize.—The active chapter of Alpha Kappa Gamma sorority presents a gold key to the student graduating from the Course for Dental Hygienists, who has maintained a scholastic average of B or higher; completed her entire course at the University of Minnesota; and is approved by the faculty.

* Such an examination may be taken only upon the approval of the appropriate committee.

‡ Such charges as may be incurred for lockers, library penalties, laboratory breakage, etc., will be deducted from the amount of this deposit and the balance will be refunded by mail upon graduation or after the beginning of the first quarter the student fails to return to the University.

‡‡ An incidental fee of $10.65 a quarter is charged each student for which the student receives privileges such as the Coffman Memorial Union, the Health Service, the Testing Bureau, the *Minnesota Daily* including the Official Daily Bulletin, and the university post-office service.

Louise C. Ball prize.—Annually, this prize, a gold and ebony engraved wall plaque, is presented to the graduating student writing the best practical talk on "Public Dental Health Education." The essays are judged by a faculty committee.

PLAN OF INSTRUCTION FOR DENTAL HYGIENISTS

	Fall		Winter		Spring		Total	
First Year	Cred.	Hrs.	Cred.	Hrs.	Cred.	Hrs.	Cred.	Hrs.
Anatomy, Elementary	3	44	.....	.....	.....	.....	3	44
Anatomy, Oral	2	44	2	44	2	44	6	132
Bacteriology, Elements of	.....	.....	.....	.....	4	66	4	66
Composition, Freshman	3	33	3	33	3	33	9	99
Economics (typing)	1	55	.....	.....	.....	.....	1	55
Economics (bookkeeping)	.....	.....	3	33	.....	.....	3	33
Personal Health	.....	.....	2	22	.....	.....	2	22
Physical Education	0	33	.....	.....	0	33	0	66
Physiology, Human	.....	.....	.....	.....	4	44	4	44
Physiological Chemistry	4	55	.....	.....	.....	.....	4	55
Prophylaxis, Dental	.....	.....	2	44	1	33	3	77
Zoology, General	3	66	3	66	4	66	10	198
	16	330	15	242	18	319	49	891
Second Year								
Assisting in Dentistry	2	55	2	55	2	55	6	165
Dental Prosthesis and Laboratory	3	66	2	44	2	44	7	154
Dental Prophylaxis	2	66	2	66	2	66	6	198
Dental Radiology	.....	.....	.....	.....	2	33	2	33
Educational School Work	2	55	2	55	2	55	6	165
Oral Histology and Pathology	.....	.....	2	22	.....	.....	2	22
General Pathology	1	11	.....	.....	.....	.....	1	11
Public Health	3	33	.....	.....	.....	.....	3	33
Oral Medicine	.....	.....	.....	.....	1	11	1	11
Psychology, Elementary	.....	.....	.....	.....	5	55	5	55
Sociology, Introduction to	.....	.....	5	55	.....	.....	5	55
Speech, Fundamentals of	3	33	3	33	.....	.....	6	66
	16	319	18	330	16	319	50	968

DESCRIPTION OF COURSES

A "dagger" (†) indicates that all quarters of the course must be completed before credit is received for any quarter.

First Year

ANATOMY

3f. Elementary Anatomy. A brief survey of human gross anatomy including a brief introduction to histology, followed by a more detailed study of the head and neck with special emphasis on the teeth and their investing structures. Lectures, laboratory studies, and demonstrations. Three lecture hours and two laboratory hours a week for one quarter. 3 credits. Dr. Boyden and staff.

BACTERIOLOGY

1s. Elements of Bacteriology. Principles of bacteriology, general survey of pathogenic bacteria, molds, protozoa, and viruses; elements of immunity; sanitary analysis of water and milk; germicides; bacterial food poisoning. Three lecture hours and three laboratory hours a week for one quarter. 4 credits. Dr. Green and staff.

DENTISTRY

7f-8w-9s.† Oral Anatomy. A course of lectures, recitations, demonstrations, and laboratory work. Lectures and recitations: oral anatomy nomenclature; special attention to definition, spelling, combining, and application of terms used in the various divisions of dentistry. Study in detail of permanent and deciduous teeth (calcification, eruption, decalcification, and shedding). Occlusion, function, and practical application is stressed in the course. Laboratory technic: each student is required to make a series of drawings of each permanent tooth; plastine carvings of natural teeth; wax carvings of natural teeth; a didactic final and a technical final of a tooth. One hour of lecture and three hours of laboratory a week for three quarters. 6 credits. Dr. Hall and assistants.

21w-22s. Dental Prophylaxis. Lectures, demonstrations and practice in the scaling and polishing of the teeth, and the teaching of oral hygiene and home care of the mouth to patients. The work is introduced by practice on manikins followed by practice on patients in the dental infirmary. One hour of lecture and three hours of laboratory a week for one quarter and three hours of clinical practice for one quarter. 4 credits. Miss Jackson.

ECONOMICS

32f.‡ Beginning Typewriting for students who have had less than one year of training. Exemption by passing test. Five hours a week for one quarter. 1 credit. Miss Peterson.

33f,w.‡ Typewriting for students who have had one year of training. Exemption by passing speed and theory tests. Five hours a week for one quarter. 1 credit. Miss Peterson.

‡ A fee of $2.50 per quarter is charged for this course.

35w.‡‡‡‡ Office Practice for Dental Hygienists. A study of the most approved practices relative to the conduct of an office; appliances, accounts, banking, correspondence, filing systems, and records. Three hours a week for one quarter. 3 credits. (Prereq. Econ. 32, 33 or equivalent.) Miss Peterson.

ENGLISH

4f-5w-6s. Freshman Composition. The study of the fundamental principles of composition and training in the art of writing. Three hours a week for three quarters. 9 credits. Arranged.

PHYSICAL EDUCATION

1f-2w-3s.‡ Elementary Physical Training. Lighter forms of gymnastics, apparatus work, orthopedic exercises, folk dancing, indoor and outdoor games. Individual health consultations. Three hours a week for two quarters. May be taken any two quarters during the first year. Arranged by staff.

PHYSIOLOGY

1f.‡‡ Elements of Physiological Chemistry. (a) A brief study of the physical and chemical laws, of the composition of matter, chemical compounds, chemical and energy changes; of the ionic theory; of gases, and solutions. (b) The physiological chemistry of gases, water, salts, carbohydrates, fats, and proteins; of the nutritive media, of digestive fluids and digestion, of the metabolism, of excretion and excretory products. Three lecture hours and two laboratory hours a week for one quarter. 4 credits. Dr. Barnum and others.

2s. Elements of Physiology. This course covers the following subjects from the standpoint of function of the human: circulation, respiration, digestion, excretion, metabolism and nutrition, special senses, nervous system and endocrines. Three lecture hours and two laboratory hours a week for one quarter. 4 credits. Mrs. Coe and others.

PUBLIC HEALTH

3w. Personal Health. Elementary principles of normal body function; pre-disposing and actual causes of disease; ways in which disease may be avoided. Two lecture hours a week for one quarter. 2 credits. Not open to students who have taken Human Biology (G.C.10C) in General College. Dr. O'Brien.

ZOOLOGY

1f-2w-3s.‡‡‡ General Zoology. This course is designed to acquaint the student with the fundamental principles of general zoology. It deals especially with the structure, physiology, embryology, classification, reproduction, and evolution of animals. Textbook, lectures, quizzes, and laboratory. Students should arrange their programs so as to remain in the same lecture and laboratory sections throughout the entire year. Two lecture hours and four laboratory hours a week for three quarters. 10 credits. Dr. Minnich and staff.

‡ A physical education fee of $1.75 per quarter is charged for this course.

‡‡ The student must purchase a $5 chemistry card from the bursar in the Administration Building. No student will be assigned a desk in the laboratory until he presents this card. The cost of special chemicals, nonreturnable equipment and breakage will be charged against this deposit.

‡‡‡ A fee of $1.50 per quarter is charged for this course.

‡‡‡‡ A fee of $2.50 per quarter is charged for this course.

Second Year

DENTISTRY

40f-41w-42s. Educational School Work. A lecture and recitation course in the preparation and delivery of talks on oral hygiene for various groups and occasions, followed by demonstrations and practical work in teaching oral hygiene in the public schools. One lecture and two laboratory hours a week for three quarters. 6 credits. Dr. White.

45f-46w-47s. Assisting in Dentistry. Lectures, demonstrations and practical experience in surgical and dental assisting, general anesthesia, operative dentistry, materia medica, and orthodontia. Five hours a week for three quarters. 6 credits. Staff.

53f-54w-55s. Dental Prophylaxis. A continuation of Dental Prophylaxis *22*. The teaching of oral hygiene is emphasized. Approximately sixty cases must be completed. Six hours a week for three quarters. 6 credits. Miss Jackson.

56f. General Pathology. An elementary discussion of general pathology including circulatory disturbances, inflammation and tumors, and special consideration of selected diseases with reference to those affecting the oral cavity. One lecture hour a week for one quarter. 1 credit. Dr. Wahlquist.

57f-58w-59s. Prosthetic Dentistry and Dental Laboratory. Prosthetic Dentistry: A course of lectures, demonstrations, and laboratory work. Lectures and demonstrations: impression materials and their manipulation; pouring of impressions and making casts; art base construction and study models; various types of denture construction including partial and complete dentures; packing, vulcanizing, curing, and finishing of cases; occlusion and articulation as applied to prosthetic dentistry. Laboratory technic: the laboratory work consists of pouring plaster impressions; making the casts, and art bases. Edentulous casts are made, trial plates constructed, and the setting-up of a complete upper and lower case to the point of vulcanization. One lecture hour and six laboratory hours a week for one quarter.

Dental Laboratory. A course of lectures, demonstrations, and laboratory work. Lectures and demonstrations: a study of the manipulation of waxes, investments, metals, plastics and porcelain, and cements; assistant's laboratory duties in various branches of dentistry such as operative, crown and bridge, and prosthesis; a study of the instruments and materials used in dentistry. Laboratory work: each student makes a series of wax models and castings for cavities of teeth; the making of indirect dies; the manipulation of porcelain, plastics; pontic construction; soldering; and the mixing and manipulation of synthetic porcelains and cements. 7 credits. (Prereq. Oral Anatomy 7-8-9 and Prosthetic Dentistry 57). Dr. Hall and assistants.

60w. Oral Histology and Pathology. The course includes a résumé of the histology of the teeth and oral tissues, thereby preparing a background for the more detailed discussion of the special pathology of these tissues. It includes systemic manifestations of oral diseases, pathology of the mandibular joint and tongue, and a review of the present status of knowledge concerning dietary influences. Two lecture hours a week for one quarter. 2 credits. (Prereq. General Pathology 56.) Dr. Radusch.

62s. Dental Radiology. A series of lectures and demonstrations on the application of Roentgen rays for dental diagnostic purposes. The course includes the electrophysics of the apparatus, positioning of the films, angulation of the machine, and processing. One lecture hour and two laboratory hours a week for one quarter. 2 credits. Dr. Simon.

72s. Oral Medicine. A study of the general diagnosis and methods of investigation related to the clinical and fundamental problems of internal medicine. One lecture hour a week for one quarter. 1 credit. Dr. Wahlquist.

PUBLIC HEALTH

51f. Community Hygiene. Elementary concepts of development, spread, and prevention of preventable diseases, community programs for their control. 3 credits. (Prereq. 3, 50, or Human Biology (G.C. 10C) in the General College; not open to students who have taken 4, 50, 52, or 53.) Dr. Cowan.

PSYCHOLOGY

Af,w,s. Elementary Psychology. An introduction to psychology with special attention to its application. Five lecture hours a week for one quarter. 5 credits. Mr. Longstaff.

SOCIOLOGY

1f,w,s. Introduction to Sociology. A study of the characteristics of human group life. An analysis of the factors associated with the development of human group life and man's social environment; the structure of the social environment and its influence upon the individual's behavior. Three lecture hours and two recitation hours a week for one quarter. 5 credits. Mr. Monachesi and others.

SPEECH

1f-2w.‡ Public Speaking. Fundamentals of effective speaking; breathing, voice production, enunciation, and action; delivery of extracts from the works of well-known writers and speakers; principles underlying speech-making to both oral and written compositions. Three hours a week for two quarters. 6 credits. (Prereq. Composition 4-5-6.) Mr. Gilkinson and others.

‡ A fee of $1 per quarter is charged for this course.