

Series VII.

Number IV.

BULLETIN
OF THE
University of Notre Dame
NOTRE DAME, INDIANA

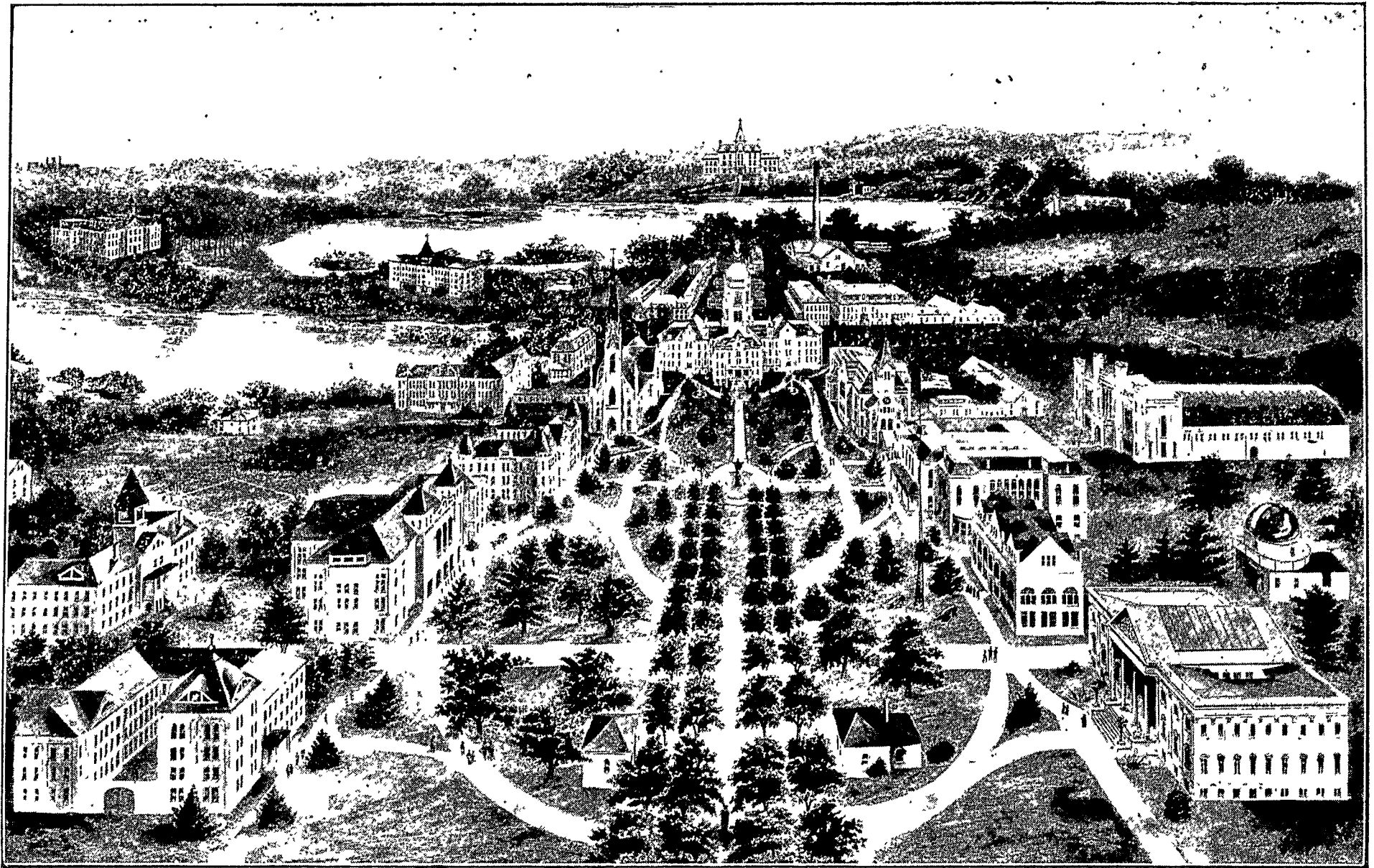


GENERAL CATALOGUE
1911-1912

PUBLISHED QUARTERLY AT NOTRE DAME

THE UNIVERSITY PRESS
APRIL, 1912

Entered at the Postoffice, Notre Dame, Indiana, as second-class matter, July 17, 1905



BIRD'S-EYE VIEW OF THE UNIVERSITY OF NOTRE DAME.

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DIRECTORY OF THE UNIVERSITY

The FACULTY—Address:

THE UNIVERSITY OF NOTRE DAME,

NOTRE DAME, INDIANA.

The STUDENTS—Address:

As for the Faculty, except that the name of the HALL in which the student lives should be added.

A Postoffice, a Telegraph Office, a Long Distance Telephone, and an Express Office are at the University.

The University is two miles from the city of South Bend, Indiana, and about eighty miles east of Chicago. The Lake Shore and Michigan Southern, the Grand Trunk, the Vandalia, the Indiana, Illinois & Iowa, the Chicago and Indiana Southern, and the Michigan Central railways run directly into South Bend. A trolley line runs cars from South Bend to the University every fifteen minutes.

The Latitude of the University is 41 degrees, 43 minutes, and 12.7 seconds North, and 86 degrees, 14 minutes and 19.3 seconds West of Greenwich.

The elevation is about 750 feet above the sea.

From this it is clear that the location is favorable for a healthful climate where students may engage in vigorous mental work without too great fatigue or danger to health.

CALENDAR FOR 1912-13.

1912

- SEPT. 10, 11. Entrance Examinations and Examination of
Conditioned Students in the Preparatory
School.
12. Preparatory School Opens.
17, 18. Entrance Examinations and Examination of
Conditioned Students in the Colleges.
19. Colleges Open.
22. Reading of University Regulations in all the
Halls.
- OCT. 13. Founder's Day. No Classes.
27. Annual Retreat begins in the evening.
- NOV. 1. Feast of All Saints. No Classes.
18, 19. Mid-Term Examinations.
28. Thanksgiving Day. No Classes.
- DEC. 7. The William P. Breen Medal Orations.
8. Feast of the Immaculate Conception. No Classes
10. President's Day. No Classes.
20. Christmas Vacation Begins.

1913

- JAN. 3. Classes Resume.
- FEB. 3¹. } Term Examinations.
1. }
3. Second Term Begins.
22. Washinton's Birthday. No Classes. Presenta-
tion of Flag by the Senior Class.
28. State Oratorical Contest.
- MARCH 17. St. Patrick's Day.
19. St. Joseph's Day.
23. Easter. No Easter Vacation.
24. Easter Monday. No Classes.
- APRIL 11, 12. Mid-Term Examinations.
- MAY 20. Latest Date for Handing in Prize Essays and
Graduating Theses in all the Colleges.
30. Decoration Day. No Classes.
3¹. } The Patrick T. Barry Medal Recitations.
The Joseph A. Lyons Medal Recitations.
- JUNE 9, 10, 11. Examination of Candidates for Graduation.
11, 13. Examinations in Preparatory School.
12. Commencement in Preparatory School.
14. Vacation in Preparatory School Begins.
15. Baccalaureate Sermon. Meeting of the Alumni.
16. Commencement. Bachelor's Orations, 10:00
a. m. Commencement Address and Gradu-
ation Exercises, 8:00 p. m.
17, 18. Examinations in the Colleges.

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Spanish.

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Shopwork.

BERTRAM G. MARIS,
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UNIVERSITY OF NOTRE DAME

The University of Notre Dame was founded in the year 1842, by the Very Reverend Edward Sorin, the late Superior General of the Congregation of Holy Cross. In an act approved January 15, 1844, the Legislature of Indiana gave the University power to grant degrees. The beginning of this act is:

“Be it enacted by the General Assembly of the State of Indiana, that Edward Frederick Sorin, Francis Lewis Cointet, Theophilus Jerome Marivault, Francis Gouesse and their associates and successors in office, be, and are hereby constituted and declared to be, a body, corporate and politic, by the name and style of the ‘University of Notre Dame du Lac,’ and by that name shall have perpetual succession, with full power and authority to confer and grant, or cause to be conferred and granted such degrees and diplomas in the liberal arts and sciences, and in law and medicine, as are usually conferred and granted in other universities in the United States, provided, however, that no degree shall be conferred or diplomas granted, except to students who have acquired the same proficiency in the liberal arts and sciences, and in law and medicine, as is customary in other universities in the United States.”

UNIVERSITY BUILDINGS.

THE ADMINISTRATION BUILDING

The dimensions of this building are 320 by 155 feet; it is five stories in height and is surmounted by a dome 207 feet in height. The executive offices, two study-halls, some dormitories and class rooms and the dining-rooms are in this building. The Library and the Bishops' Memorial Hall are also here temporarily. This building, like all the others of the University, is lighted by electricity and gas, and heated by steam. The corridors of the first floor are decorated with mural paintings by Gregori.

THE CHURCH

The Church of the Sacred Heart is 275 by 120 feet in ground dimension and 125 in height from the floor to the roof ridge. The interior is decorated by Gregori, and the architecture is Gothic. There is a large crypt and many chapels. In the tower is a chime of 32 bells and the great six-ton chief bell.

THE LIBRARY

The Library contains 55,000 volumes and several thousand unbound pamphlets and manuscripts. The department of literary criticism, history, political science and the Greek and Latin classics are well represented. Special libraries containing reference works on technical subjects are provided in the Colleges of Engineering and Science. The College of Law has a complete library of its own. Ample reading room is provided in the main library. The best literary magazines and reviews, as well as current numbers

of scientific and technical journals are kept on file. Students have access to the Library from 8:00 A. M. to 9:00 P. M.

WASHINGTON HALL

This hall is 170 feet in length, 100 feet in width, and about 100 feet in height. It contains the rooms of the Department of Music, the reading rooms for Brownson and Carroll Halls, and the University Theatre. The theatre is elaborately equipped with stage settings. It will seat 1,200 persons. Lectures by men eminent in public and professional life are given here. Concerts and plays by professional companies are also presented in this theatre. The dramatic clubs of the University present several plays annually.

SCIENCE HALL

is situated a few steps south of Washington Hall. Its dimensions are 105 by 131 feet, and it is three stories in height. A large central space, the full height of the building, is occupied by a museum containing mineral, fossil and biological specimens. The departments of Physics, Electrical Engineering, Civil Engineering, Philosophy, Botany and Biology have recitation rooms and laboratories in this building. The equipment for each of these departments is extensive and complete. Description of the equipment will be found later in this catalogue.

THE MUSEUM

connected with the departments named above, is well arranged for convenience of study. The sociological collection on the second floor at present fills sixteen large cases and represents typical forms of all the orders and genera of vertebrate and invertebrate animals. A large collection of representative ver-

tebrate skeletons forms a considerable part of the museum.

Facilities for the publication of research on subjects of natural history are afforded in the pages of the *American Midland Naturalist*, which appears bi-monthly from the laboratory of botany at the University.

The collection in Geology and Mineralogy occupy the first floor. These collections are arranged in a series of cases on each side of the building. In one series is a carefully classified collection of minerals and ores. The opposite series of cases contain a large geological collection; some of the specimens here are of the rarest fossil remains of animals and plant life.

THE CHEMICAL LABORATORIES

occupy a large three-story building directly south of Science Hall. The entire first floor is devoted to advanced work and space is given to three large laboratories, a library and lecture room. The second floor is occupied by the Department of Pharmacy, and contains a large, well-equipped laboratory, a modern drug store, a lecture room and museum, a library for pharmaceutical publications, and a general stock room. The general inorganic, organic and elementary chemical laboratories are on the third floor. Each laboratory is provided with ample hood accommodations, and each desk is furnished with water, gas and suction.

THE SHOP

This building is situated in the southern part of the grounds and is a large two-story brick structure, well lighted and heated. The lower floor contains the mechanical laboratory, machine shop, blacksmith shop

and foundry. The second floor provides the shop for wood-work and also contains a well lighted drawing room where students in designing may consult complete workings of the best steam engines and pumps to be found on the market.

THE OBSERVATORY

This building is located near the Chemical Laboratories and is designed for an equatorial telescope and for a transit or meridian circle. The equatorial telescope now in the building is intended for students of astronomy, and is in use whenever favorable weather permits.

SORIN HALL

This building is 144 feet in length, with two wings 121 feet in depth. It has a basement and three high stories, and contains 101 private rooms for advanced students. These rooms are furnished, and students of Senior, Junior, or Sophomore standing in any of the Colleges are not required to pay rent. On the first floor there is a chapel, a law lecture room and a law library. The building is lighted with electricity and heated with steam. In the basement are recreation rooms and bath rooms.

CORBY HALL

Corby Hall is a second residence building. It has three stories and a basement, and is 240 feet in width. There are 125 private rooms for students, with recreation rooms and a chapel. The building is lighted with electricity and gas and heated with steam.

WALSH HALL

This newest dormitory building is situated South of Sorin, fronting the quadrangle. Its dimensions

are 230 feet by 41 feet. It faces East and all the front rooms are made up of suites each consisting of a commodious study room, flanked on either side by a bedroom. Attached to each suite is a private bath and toilet. Each room is supplied with hot and cold water. The rear rooms are singles and the general toilet and bath rooms are of hollow, fire-proof tile, walls and ceilings covered with wire lath and plaster, making practically a fire proof building. It is equipped with a distinct system of stand-pipes for fighting fire. The entire corridor floors are built of reinforced concrete, covered with Roman ceramic mosaics. In finish and equipment Walsh Hall is believed to be the best college dormitory building in America. It embraces three stories besides the admirable basement and attic, and it is capable of accommodating over a hundred students.

BROWNSON HALL

Brownson Hall occupies the east wing of the Administration Building and contains the living and study rooms of Preparatory students of seventeen years of age and upwards. There is a common study hall, a common lavatory, and two large sleeping rooms in which each student has an alcove curtained to secure a personal privacy. Experience shows that the discipline of these common rooms works admirable effects on students who have not yet contracted solid habits of study.

CARROLL HALL

Carroll Hall is in the west wing of the Administration Building. It is in all respects similar to Brownson Hall, except that it is intended for younger students. The regulations are more particularly adapted to their

age and scholastic attainments. Preparatory students between the ages of thirteen and seventeen years are placed in this hall.

ST. JOSEPH'S HALL

St. Joseph's Hall is located at the extreme southwestern end of the campus and is devoted exclusively to living and study rooms. In this building live those students who defray one-half the cost of board and tuition by waiting at table during the meals. The conditions for admission to this hall are: (1) The payment of two hundred dollars (\$200.00) a year on the first of August, and (2) satisfactory service as a waiter. The waiting in nowise interferes with the student's work, and all the educational advantages are open to him. It is to be regretted that through the lack of endowment the University can offer only a limited number of such opportunities each year. It is necessary to apply early for these appointments.

THE INFIRMARY

This building, 200 feet by 45 feet in ground measurement and three stories in height, contains rooms for the use of students during illness. The sick are cared for by Sisters of the Holy Cross, and the University physician visits them daily.

THE GYMNASIUM

The Gymnasium which was burned down in November, 1900, was replaced by a building 230 by 200 feet on the ground. The track-hall is now 100 by 180 feet on the ground. It is used for indoor meets, winter baseball practice, basketball and military drill. The gymnastic hall is 100 by 40 feet and is furnished with a full set of apparatus; below that are the offices, dressing-rooms and shower baths. Friends of the

University and the alumni contributed more than three thousand dollars to the fund for rebuilding.

Cartier field is an enclosed field for athletic games. There is a permanent grand stand near the baseball diamond and the running track, and a portable stand near the football rectangle. The field contains ten acres of ground, and is a gift to the University from Mr. Warren A. Cartier, C. E., of the class of '87.

OTHER BUILDINGS

There are numerous other large buildings connected with the University: Holy Cross Hall, Dujarie Hall, the Community House, the Presbytery, and Saint Edward's Hall, the last-named being a school for children under the age of thirteen, in care of the Sisters of the Holy Cross.

SYSTEM OF INSTRUCTION

The entire plan of studies is based on the modified elective system. The student is free to select his own curriculum conformably to his natural liking, the career in life he may have in view, or the determinate intellectual bent developed during his secondary school years; but, though he is free to elect his own studies, he has not, however, unlimited freedom in this respect. The principle of general election is modified. Lest the young Freshman in his inexperience choose unwisely, he is aided in making his choice of studies by being permitted to select from among a number of parallel programs leading to baccalauréatè degrees. Eighteen programs are open for his choice in the Colleges, each embracing courses which, in the opinion of the Faculty, contribute best to cultural, scientific or professional knowledge. These programs

are, in some cases, made elastic by the introduction of elective courses, especially in the Junior and Senior years. Students who wish to spend a limited time in study and can not complete all the courses in a program for a degree may register as special students and elect any course for which their preparation has fitted them.

The hours scheduled in the different programs are credit hours based on the average amount of time required for preparation of recitations. One hour of recitation is regarded as the equivalent of two hours of laboratory work. The minimum number of credit hours which a student must carry, except in his Senior year, is sixteen, the maximum number which he may ordinarily carry is twenty. Students who wish to take more work than is indicated by the maximum requirements must apply by formal petition to the Faculty for the requisite permission.

REGULATIONS GOVERNING ADMISSION TO THE COLLEGES

Candidates who wish to enter any of the Colleges must present evidence, either by examination or by a properly attested certificate, of ability to enter on the courses of the Freshman year. The specific subjects required for entrance will be found later in this catalogue.

Examinations in all the subjects required for admission to the University are held at Notre Dame in September, at the beginning of the Fall Term and in February, at the beginning of the Spring Term.

A candidate failing to pass satisfactory examinations in one or more of the subjects required for admission to any college program may, at the discretion of the Faculty, be admitted to his class con-

ditioned, to make up his deficiency by extra study *within one school year*. Only when the conditions are removed will the student be admitted to full standing in his class.

Students who have completed a four year course in High Schools or Preparatory Schools of recognized standing will be admitted without examination to the Freshman year of any program to which their preparatory studies entitle them.

Candidates for admission to advanced standing who are required to take examinations must pass, *in addition* to the usual entrance examinations, an examination in the work already done by the classes they desire to enter. The additional subjects may be found in the several programs of studies described later in this catalogue.

Applicants for advanced standing who present certificates from other colleges or universities may be received at the discretion of the Faculty with or without examination as regards particular cases.

No students will be admitted to any course of the Senior year until all conditions have been cancelled.

Catholic students are required to take the prescribed courses in Evidences of Religion.

ENTRANCE REQUIREMENTS FOR VARIOUS COLLEGES IN SUBJECTS AND UNITS
COLLEGES

SUBJECTS	ARTS	LETTERS*	SCIENCE	ENGINEERING	ARCHITECTURE	LAW
	Units	Units	Units	Units	Units	Units
English.....	4	4	4	4	4	4
Latin.....	4	4	2			2 OR 4
Greek.....	3					
French or German.....		3	2	3	3	2†
History.....	2	2	2	2	2	2
Algebra.....	1	1	1 1/2	1 1/2	1 1/2	1
Geometry.....	1	1	1 1/2	1 1/2	1 1/2	1
Trigonometry.....			1/2	1/2	1/2	
Chemistry.....	†	†	1	1	1	†
Physics.....			1	1	1	
Botany, Physiology, Zoology, Physiography.....						
Drawing.....			1/2	1/2	1/2	
Elective.....				1	1	3
Total.....	16	16	16	16	16	16

* Including Department of Letters and Department of History and Economics.
† Four units of language required. ‡ For admission to the Colleges of Arts and Letters and Law one unit of Science is required

DEGREES

Degrees are conferred only on regular students who have satisfied the full entrance requirements and have completed satisfactorily the courses prescribed. The courses required for the several degrees conferred by the University will be found described in this catalogue. Written theses and formal examinations are demanded of all candidates for degrees. One full scholastic year of resident study is absolutely required.

BACHELORS

The courses of study offered to candidates for the degree of Bachelor extend by fixed programs throughout the four scholastic years. In the College of Arts and Letters one of three degrees is conferred on an undergraduate—Bachelor of Arts (A. B.), Bachelor of Letters (Litt. B.), Bachelor of Philosophy (Ph. B.)—dependent on the special program of studies the candidate selects. The College of Science offers six degrees for choice to undergraduates—Bachelor of Science (B. S.), Bachelor of Science in Biology (B. S. Biol.), Bachelor of Science in Chemistry (B. S. Chem.), Bachelor of Science in Pharmacy (B. S. in Ph.), Graduate in Pharmacy (Ph. G.), Pharmaceutical Chemist (Ph. C.). The College of Engineering offers five degrees—Civil Engineer (C. E.), Mechanical Engineer (M. E.), Electrical Engineer (E. E.), mining Engineer (E. M.), and Chemical Engineer (Ch. E.). Two degrees are offered by the College of Architecture—Bachelor of Science in Architecture (B. S. A.), and Bachelor of Science in Architectural Engineering (B. S. A. E.). The College of Law offers the degree of Bachelor of Laws (LL. B.). In the College of Music one degree is offered—Bachelor of Music (B. M.). In order to obtain this degree the candidate must have studied

music in the University for one complete year. He must have a thorough theoretical knowledge of four instruments mentioned in the courses described later, and a practical mastery of one of them. He shall pass a written examination in harmony, counterpoint and composition, and he must submit to the examiner two original compositions: (a) a fugue for full orchestra, or for four voices with independent orchestral accompaniment: (b) a composition in the free form (sonata or rondo) for pianoforte, or a trio (pianoforte, violin and violincello.)

The degree of Bachelor will not be conferred unless the candidate shall have been in residence for one complete scholastic year in his *Senior* year of study.

MASTERS

The degree of Master is open to students who have received the degree of Bachelor from Notre Dame or from some other college in good standing, and who make application to the Committee of the Faculty on Graduate Study for the privilege of pursuing advanced work. All work must be approved by this Committee. One year of residence, at least, is required of candidates who have received their Bachelor's degree at another college. Those who have received their Bachelor's degree from Notre Dame, may, in some cases to be determined by the Committee, obtain the Master's degree for work done *in absentia*.* One major and one or two minor courses will constitute the curriculum, forming a consistent coördinated plan of advanced work pursued with some definite aim. On completion of the required work the candidate

* No degree is conferred *in honorem* except the degree of Doctor of Laws (LL. D.)

must pass a satisfactory examination in writing, under the professors who give his subjects of instruction. The candidates for this degree must also write a dissertation of notable merit on some topic connected with his major subject, the thesis to contain in the minimum five thousand words. The subject of the thesis must be announced to the Committee by December 1, and submitted for examination by May 15. Five printed or typewritten copies of the thesis must be presented to the University to be placed in the library. The fee for examination of work done *in absentia* is twenty-five dollars. The fee for this degree is fixed at fifteen dollars.

DOCTOR OF PHILOSOPHY

Three years must be spent by the candidate in University work before the degree of Doctor shall be conferred,—two of these must be spent at Notre Dame and one may be passed at some other university on approval of the Committee of the Faculty on Graduate Study. The candidate must pass satisfactorily examinations in French and German on entrance. The work for the degree shall consist of one major and two minor courses of instruction approved by the Committee. Research study shall form the most important part of the candidate's work. On completion of his work the candidate must pass minute examinations on the three subjects of his curriculum and must defend his dissertation before the whole Faculty. The thesis must be printed and one hundred and fifty copies presented to the University. A copy of the thesis must be handed to the Committee one month before the examinations. The degree will not be conferred for merely faithful work, and not for miscellaneous study, but for original research and for high attain-

ment in one branch of study. The fee for this degree is fixed at twenty-five dollars.

SPECIAL STUDENTS

Students who, do not wish to become candidates for a degree by following the prescribed courses of any program may register as special students and attend any of the courses of instruction for which their previous academic training has fitted them. Such special students are governed by the same regulations and discipline as the other undergraduates. They are required to pass the same examinations in the courses they pursue as the other students. In exceptional cases men of mature age, who have been out of school or college for several years, but whose training in practical affairs has been sufficiently educative, will be accepted as special students by satisfying the Faculty of their ability to pursue with profit any course of instruction.

On leaving the University special students may receive on application certificates stating their proficiency in the courses they have pursued.

SCHOLARSHIPS

The University has at present only four foundations which yield revenues for the support and tuition of four students annually. Assignment of these scholarships is made under restrictions indicated with each gift. No student will be continued in the enjoyment of a scholarship whose superiority in college work is not clearly indicated in his first year of residence. Nor will a student who has incurred serious censure by breach of the regulations of the University be considered again as a candidate for a scholarship.

It is a matter of great regret that the lack of endowment makes it impossible for the University to give place to a greater number of deserving students who are not able to pay the charges of board and tuition. Under conditions indicated on page 17 of this catalogue a limited number of deserving student-waiters can be received at reduced rates. Certain clerkships in the University offices and positions in the libraries are also open to worthy students. Information regarding the assignment of these places will be furnished by the President. The University is doing all in its power to assist students in narrow circumstances. The friends of Notre Dame are asked to assist in this work.

THE JOHNSON SCHOLARSHIP

In 1899 Dr. Edward Johnson, of Watertown, Wisconsin, gave a fund of four thousand dollars, the income of which aids in the support of one student annually. By the terms of the gift assignment is made only to a student who intends to enter the priesthood.

THE CARROLL SCHOLARSHIP

The Reverend Thomas Carroll, of Oil City, Pennsylvania, bequeathed five thousand dollars in 1899. The terms of the bequest specify that the income shall be used to aid a student from Oil City.

THE FORD SCHOLARSHIP

In 1900 Mrs. Catherine Ford, of Chicago, gave to the University certain properties for the maintenance of worthy students. The income arising from this gift now supports fully two students annually. By the wish of the donor nominations for these scholarships are made from St. Jarlath's parish, Chicago.

PRIZES

The following prizes and honors within the gift of the University are awarded annually under conditions named below. Any of these prizes may be withheld by the Faculty if the student incur serious censure for violating any of the regulations of the University.

THE QUAN MEDAL FOR CLASSICS

A gold medal is yearly given to the student who has obtained the best record in the Senior year of the Classical Program. The medal is the gift of Mr. William J. Quan, of Chicago, and is awarded only on condition that the record of the student is notably good in all the courses of instruction prescribed for the Senior year.

THE MASON MEDAL

A gold medal, the gift of Mr. George Mason, of Chicago, is awarded each year to the student of the Preparatory School whose scholastic record is superior to that of his fellows. Observance of the University regulations counts in the award. The prize may be withheld if in the opinion of the Faculty the record of the student has not reached a high standard.

THE MEEHAN MEDAL FOR ENGLISH ESSAYS

A gold medal, the gift of Mrs. Eleanor Meehan, of Covington, Ky., is awarded every year to the Senior (undergraduate) who presents the best dissertation in English. Essays offered in competition may be on any subject approved by the head of the Department of English. Those offered for graduation may be presented in competition. The faculty will not award the prize, if, in the opinion of the judges selected, the best essay is not notably meritorious.

THE BREEN MEDAL FOR ORATORY

This prize is the gift of the Honorable William P. Breen, of the Class of '77, and is annually awarded to the student who excels in oratory. The award is made by a committee of three selected by the faculty and after a public competition. The winner represents the University in the Indiana State Oratorical Contest held the third Friday in every February. No student may receive the Breen Medal more than once, but the winner of this prize may compete again for the honor of representing the University in the State Contest.

There is also a ten-dollar prize offered for the winners of the Freshman, Sophomore, Junior and Preparatory contests in oratory.

THE MARTIN J. McCUE MEDAL FOR CIVIL ENGINEERING

The McCue Medal for Civil Engineering, presented by Mr. Warren A. Cartier, Civil Engineer, of the Class of '87, is awarded to the student of the Department of Civil Engineering who has obtained the best record in all the courses prescribed in the program. The medal is awarded only when the student's record has attained a fixed standard. In computing the grades the courses in mathematics count fifty per cent. Only students who have been in residence for four full years are eligible to compete for this prize.

THE MEDALS FOR ELOCUTION

Two prizes known as the Joseph A. Lyons Medal and the Patrick T. Barry Medal are awarded every year for excellence in elocution. The award is made after competition in public. In order to be eligible to compete, students must have followed at least

two of the courses of instruction in public speaking. One of the medals was founded in memory of Professor Joseph A. Lyons, of the Class of '62, who served the University as Professor of Elocution and Oratory from 1872 to 1888. The other is a gift of Mr. Patrick T. Barry, of Chicago.

THE PRIZE FOR PUBLIC DEBATING

A prize of seventy-five dollars is awarded to three students who, in the opinion of a committee of judges from without the Faculty, excel in debating. The award is made after a competition in public. The prize is divided, thirty dollars going to the student who receives the highest marks, twenty-five dollars, to the second, and twenty dollars to the third. The three students who are successful in the competition ordinarily represent the University in the principal inter-collegiate debate of the year.

DISCIPLINE

Official reports of each student's class standing will be sent to parents and guardians quarterly.

The Faculty maintains that an education which gives little attention to the development of the moral part of a youth's character is pernicious, and that it is impossible to bring about this development where students are granted absolute relaxation from all Faculty government while outside the class-room. A young man must learn obedience to law by the actual practice of obedience. Here students are required to obtain permission for any departure from the regular daily routine.

Moreover, the quiet and concentration of mind that are needed for college work are not obtained except where discipline exists.

Therefore the following regulations, shown by experience to be salutary, are enforced at the University.

1. No student shall leave the University grounds without permission from the President or the person delegated to represent him.

2. Leave of absence will not be granted to students during the term, except in cases of urgent necessity. There is no vacation at Easter.

3. Students are required to report at the University immediately after arriving at South Bend. This rule is binding not only at the beginning of the scholastic year, but at all other times when leave of absence has been granted. Unnecessary delay in South Bend is looked upon as a serious violation of rule.

4. Flagrant disobedience to authority, cheating in examinations, the use of intoxicating liquors, immorality, the use of profane and obscene language, and an unauthorized absence from the University limits are among the causes for expulsion. In case of suspension or expulsion for such offences, no fee shall be returned.

5. The use of cigarettes is strictly forbidden, a second offence being punished by suspension for one month.

6. No branch of study shall be taken up or discontinued without the consent of the Director of Studies.

7. Preparatory students are enrolled in Brownson, Carroll or St. Edward's Hall according to age; boys seventeen years of age or older are placed in Brownson Hall; those over thirteen and under seventeen, in Carroll Hall, and those under thirteen, in St. Edward's Hall.

8. The use of tobacco is forbidden except to such

students of Sorin, Corby, Walsh and Brownson Halls as have received from their parents written permission to use tobacco.

9. Continued violation of regulations in Sorin, Corby or Walsh Halls leads to forfeiture of rooms.

10. Although students of all religious denominations are received, the University is nevertheless a strictly Catholic institution, and all students are required to attend divine service in the University Church at stated times.

11. Undue attention to athletics at the expense of study will not be permitted; but students are expected to take part in outdoor sports.

12. A limited number of athletic contests is permitted with college organizations from without.

13. All athletic associations of the students are strictly forbidden to countenance anything that savors of professionalism.

14. All athletics are governed by a Faculty Board of Control which will be guided in its rulings by the regulations adopted by the Conference Colleges. The Vice-President of the University and six members of the Faculty will compose this Board, and reserve the right of a final decision on all questions concerning athletics. The Faculty Board will determine the amateur standing of the members of the athletic teams and apportion the finances. By this means indiscreet and unconsidered action of students will be checked.

LECTURES AND CONCERTS

Each winter, eminent men are invited to lecture before the students. Among those who have addressed the University in the past few years may be noted four Apostolic Delegates, Cardinals Satolli,

Martinelli, and Falconio and Monsignor Agius; Archbishops Ireland, Riordan, Keane, Glennon, Christie and Spalding; and Bishops Alerding, McQuaid, Maes, Muldoon, O'Gorman, Shanley and MacSherry. There were also such noted European churchmen as the Abbé Felix Klein, Bishop John S. Vaughan and the foremost of living English historians, Dom Gasquet; also men of letters like Rev. D. J. Stafford, Marion Crawford, Maurice Francis Egan, Henry Van Dyke, Seumas MacManus, William Butler Yeats, James Jeffrey Roche, Hamilton Wright Mabie, Opie Read, Leland Powers, Henry James and the Rev. John Talbot Smith; and such men of affairs as President Taft, ex-Vice-President Fairbanks, ex-Senator Hill, ex-Senator Beveridge, ex-Attorney General Charles Jerome Bonaparte, ex-Representative J. Adam Bede, the Honorable William P. Breen, Representative Bourke Cochran, Dr. James C. Monaghan, Willis M. Moore, the Honorable Edward McDermott, His Excellency Wu ting Fang, William Jennings Bryan, Senator B. F. Shively, Max Pam, Governor J. Harmon, Hannis Taylor and Chief-Justice Fitzpatrick of Canada.

Concerts are given frequently by organizations from without.

During the year 1911-12 the University offered a course of public lectures and concerts in Washington Hall, in addition to the regular and special lectures required by the courses of instruction. The course was as follows:

DRAMATICS

- DEC. 6. (President's Day)—"The Redemption of Jimmie Anson."—UNIVERSITY DRAMATIC CLUB.
 20. Student Vaudeville.
 MAR. 19. "The King of the Kilts."—PHILOPATRIANS.
 APR. 8. "The Rise of Peter McCabe."—SENIOR CLASS.
 MAY 15. Student Vaudeville.

CONCERTS

- SEPT. 18. Elbel's Band.
 19. " "
 20. " "
 21. " "
 OCT. 3. Bruno Steindel Trio.
 NOV. 2. Cambrian National Glee Singers.
 JAN. 9. Good Fellows Company.
 20. Detroit String Quartette.
 24. Sol Marcossou Company.
 FEB. 24. International Opera Company.
 MAR. 23. Bostonia Sextette.
 APR. 24. The Plectrio.—Instrumentalists.

LECTURES

- OCT. 18. Newman Travelogue.—"Rural England and the Coronation of George Fifth."
 19. Readings from his Poems.—T. A. Daly.
 24. "Reminiscences of Men and Movements."—Frederick Wile.
 25. Newman Travelogue.—"Scotland and Wales."
 NOV. 1. Newman Travelogue.—"Ireland."
 4. Opie Read—Readings from his books.
 6. "An Old Time University Man."—Dr. James J. Walsh.
 8. "A Modern University Man."—Dr. James J. Walsh.
 8. Newman Travelogue.—"Germany from the Black Forest to Hamburg."
 9. Ross Crane.—Cartoonist.
 11. "Babylonia."—Dr. Edgar J. Banks.
 15. Newman Travelogue.—"Russia from the Black Sea to the Baltic."
 16. "The Gaelic Revival."—Rev. M. O'Flanagan.
 18. "Bismya."—Dr. Edgar J. Banks.
 21. "Journalism."—Mr. George Griswold Hill.
 25. "Egypt."—Dr. Edgar J. Banks.
 28. "The Boy Problem."—Judge Lee S. Estelle.
 DEC. 2. "Persia."—Dr. Edgar J. Banks.
 9. "India."—Dr. Edgar J. Banks.
 16. "The Hittites."—Dr. Edgar J. Banks.

- JAN. 13. "The South, the Old and the New."—Gov. R. B. Glinn.
 FEB. 3. S. Landon.—Impersonator.
 27. Charlemagne Koehler.—Miscellaneous Readings.
 27. Leland T. Powers.—"Monsieur Beaucaire."
 MAR. 26. "South American Trade Relations."—Hon. John
 W. O'Hara.
 APR. 16. "The Music Master."—Arthur Kachel, Reader.
 23. "Leonardo da Vinci."—Dr. James J. Walsh.

STUDENT SOCIETIES

There are several literary and debating societies in the University which do such creditable work at their meetings and in preparation for them that their work takes on the nature of added courses of instruction. In each society a member of the Faculty acts as adviser. An Inter-Hall League has been formed and public debates are held annually. The College of Law also has an active debating club. The training in public speaking has always received special attention at the University. In seventeen public debates with other universities and colleges Notre Dame has but once met defeat—the decision of the judges in the greater number of these debates being unanimous. The University Dramatic Club and the Philopatrian Society stage at least three plays annually for presentation in public. The University Band, the University Orchestra and the University Glee Club also appear regularly in concerts.

Students of the Department of Civil and Electrical Engineering have each a society in which papers on engineering subjects are read and discussed. Men prominent in their profession are invited to lecture to these societies. The Pharmaceutical Society meets to discuss subjects of interest in the world of pharmacy. In other departments where no such formal organization has been effected similar results are reached by seminars.

NECESSARY EXPENSES

Matriculation Fee (payable on first entrance).....	\$ 10.00
BOARD, TUITION, Lodging, Washing, and Mending of Linen, per school year.....	400.00

PAYABLE ON ENTRANCE IN SEPTEMBER

Matriculation Fee (payable first year only).....	\$ 10.00
First Payment on Board and Tuition.....	250.00
Use of Gymnasium and Natatorium and admission to intercollegiate games and contests throughout the year.....	10.00
Special Lecture, Entertainment and Concert Course....	5.00

Spending money or orders for clothing will not be given students unless a deposit has been made for this purpose.

In this First Payment must also be included any Extra Expense the student may wish to incur, such as charges for Private Room or Special Courses (listed below).

PAYABLE ON JANUARY 15

Balance on Board and Tuition.....	\$150.00
and any extra expenses the student may have incurred.	

No student will be entered for the second term whose account for the first term has not been adjusted.

No rebate will be allowed for time of absence at the opening of the Terms, September and February. The charge of \$400.00 covers the tuition fee, which is fixed at \$100.00 per Scholastic Year. The latter sum is accepted as an entirety for Tuition during the Scholastic Year, and will not be refunded in whole or part if the student be dismissed for wilful infraction of the fundamental rules and regulations herein stated and hereby brought to his notice; and so likewise in the event of his leaving and absenting himself from the University at any time or for any cause without proper permission. However, an exception is made if it seems to be expedient for him to go to his home because of severe or protracted illness. Degrees will not be conferred on any student whose account with the University has not been settled.

OPTIONAL EXPENSES—PAYABLE IN ADVANCE

For the Scholastic Year:

PRIVATE ROOMS—

Seniors, Juniors, and Sophomores Free, but a nominal charge of \$15.00 is made to defray expenses connected with the care of rooms; Freshmen . . . \$50.00 and upwards

It must be distinctly understood that reference is here made only to Seniors, Juniors and Sophomores who bear no conditions; that is to say, who have completed all the subjects in the Preparatory and Freshman work, otherwise regular rent will be charged for rooms. Similarly, only unconditioned Freshmen are allowed the special rate quoted above.

Preparatory Students \$80.00 and upwards.

While students, as a rule, are advised to confine themselves to the regular courses of the programs they have entered, any of the following may be taken at the rate mentioned per Scholastic Year, payable in advance. The charges are pro rata for any portion of the year.

Instrumental Music—Lessons on Piano and use of Instrument	\$60.00	Lessons on Guitar, Flute, Cornet, Clarinet or Mandolin	30.00
Use of Piano for Advanced Students	\$30.00	Lessons on Violin	60.00
Telegraphy	25.00	*Use of each instrument	5.00
Typewriting, Full Course	20.00	Artistic Drawing	25.00
One month	5.00	Elocution, Special Course	10.00
Phonography	15.00	“Scholastic”—College Paper	1.50
Applied Electricity	25.00	Library Fee	5.00
Vocal Culture	75.00	Physical Culture	5.00

Laboratory fees listed later in this catalogue.

GRADUATION FEE

For all Courses leading to Bachelor Degrees, \$10.00; Commercial Course, \$5.00.

* As the string and band instruments available for rent are few, students taking up these studies are advised to furnish their own instruments.

REMARKS

Term bills and other accounts are subject to sight draft if not paid within ten days after they have been rendered.

The Entrance Fees, cost of Books, Music and Laboratory Fees, etc., are required with first payment.

Remittance should be made by draft, post-office money order or express, payable to the order of the President.

Checks on local banks are not desirable, and exchange will be charged in all cases.

Sorin, Corby, Walsh, Brownson and Carroll Halls are closed during the months of July and August. Students wishing to spend their Summer Vacation under the care of the University authorities can be accommodated at San José Park, Lawton, Michigan.

The charge for the vacation at San José Park is \$100.00. Classes (two hours per day) are included in this arrangement. Special tutoring at professors' rates.

A limited number of student waiters can be received at reduced rates. For conditions of entrance see paragraph entitled St. Joseph's Hall, page 17.

COLLEGE OF ARTS AND LETTERS

DEPARTMENT OF CLASSICS

DEPARTMENT OF LETTERS

DEPARTMENT OF HISTORY AND ECONOMICS

DEPARTMENT OF JOURNALISM

THE COLLEGE OF ARTS AND LETTERS

From the founding of the University in 1842 to the establishment of the College of Science in 1865, only one program of prescribed courses of instruction leading to a degree was offered to undergraduate students. It embraced studies in the ancient and modern languages, in English literature, in history, the natural sciences and in mathematics. Graduate students might obtain a degree of master by advanced study one year after obtaining the Bachelor's degree. The group of courses was known as the Program of Classics, and the degrees of Bachelor of Arts and Master of Arts were conferred.

The demand of students for greater freedom of election in courses led the University in 1886 and again in 1898 to form other programs which embraced certain studies not contained in the Program of Classics, but which lead to degrees equivalent to the degree of Bachelor of Arts. In the matter of election of courses the student is permitted greater freedom in the program leading to the degree of Bachelor of Letters than in either of the other groups. The degrees now under charge of the College of Arts and Letters are the ordinary degrees of Bachelor of Arts, Bachelor of Letters, Bachelor of Philosophy and Master of Arts.

The location of the University offers special advantages of study. It is situated on a beautiful tract where cultivation has aided nature, two miles from the noisy bustle of city life. This removal from the distractions of the town gives the students opportunity to pursue their work with the quiet and concentration needed for earnest study. Nearly all the Faculty live on the grounds of the University, dine with the students, and are accessible to them at any time.

The benefits derived from this constant association with professors can not be overestimated.

Facilities for work are found in the libraries and laboratories. The main library has fifty-five thousand bound volumes well selected and several thousand pamphlets and manuscripts. The leading literary and scientific reviews are kept on file. Books may be borrowed under easy regulations. The library contains ample reading room space and is well lighted so that students may use it at night. It is open every day from 8:00 o'clock A. M. to 9:00 P. M. There are also special collections of books in the various departments of the College, mainly works of reference. Under certain conditions the city library of South Bend is open to use by students of the University.

The department of experimental psychology occupies a suite of three rooms on the ground floor of Science Hall. The use of a dark room and a silent room may also be had when need requires. The equipment includes apparatus and material sufficient for repeating all the exercises in Sanford's *Manual*, and most of the exercises in Titchener's *Experimental Psychology*, Volume I. The laboratory is supplied with hot and cold water, gas and electricity. At the beginning of the course, the aim is to give students a wide acquaintance with such familiar apparatus as the chronoscope, kymograph, plethysmograph, automatograph, primeter, campimeter, tone variator, Galton whistle, Galton bar, etc. For the study of special perceptions, there is a set of stereoscopes, pseudoscopes, and accompanying slides. Provision is also made for the investigation of pressure, temperature, pain, taste, smell and muscular sensation. Experiments in the field of auditory perception are facilitated by three sets

of organ pipes, a set of Koenig's movable tuning forks and resonators, and various kinds of metronomes. For the study of physiological psychology, a complete set of models of the nervous system is at hand, together with microscopic slides of the various parts of the brain and spinal cord.

ENTRANCE SUBJECTS

ENGLISH. Part of the examination time is given for answering questions upon the text-books and required readings in the preparatory courses in English; the remainder, for writing an essay.

LATIN. Grammar, complete; *Cæsar*, four books of the Gallic War; *Cicero*, four orations against Cataline; *Vergil*, *Aeneid*, six books; translations at sight of passages from *Cicero* and *Cæsar*; translations of English into Latin based on the text of the authors.

GREEK. (*For students in the Department of Classics only*) Grammar, etymology and general rules of syntax; *Xenophon*, *Anabasis*, four Books; *Homer*, at least three books; prose composition based on text.

HISTORY. A general knowledge of the outlines of Greek and Roman History and of Medieval and Modern History, as set out in the texts used in high schools and other secondary schools.

CIVIL GOVERNMENT. The Constitution of the United States; Federal Government and State Government.

ALGEBRA. The whole subject as far as logarithms, as given in *Wentworth's College Algebra*, or an equivalent in the larger treatises of other authors.

GEOMETRY. Plane and Solid, including the solution of simple original problems and numerical examples as given in the works of *Wentworth*, *Chauvenet*, *Newcomb*, or an equivalent in treatises by other authors.

PHYSICAL GEOGRAPHY. As given in *Tarr's* text-book or an equivalent treatise.

ZOOLOGY, BOTANY. Elementary.

PHYSIOLOGY. *Martin's Human Body*, or an equivalent text.

CHEMISTRY. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations, and laboratory work in which at least fifty experiments have been exemplified.

PHYSICS. Elementary. The preparation in this subject should include a course of lectures illustrated by experiments, and recitations from a text-book similar to *Carhart and Chute's* or *Gage's*. Laboratory work is required. In both chemistry and physics the laboratory note-book must be presented.

FRENCH AND GERMAN. A three years' course of either German or French is required for entrance on the Program in Letters and the Program in History and Economics.

Subjects required for entrance to Freshman year of the Department of:

CLASSICS	LETTERS
English.....4	English.....4
Latin.....4	Latin.....4
Greek.....3	French or German.....3
Mathematics.....2	Mathematics.....2
History.....2	History.....2
Science.....1	Science.....1
· HISTORY AND ECONOMICS	
English.....4	JOURNALISM
Latin.....4	English.....4
French or German.....3	Latin, French or German... 6
History.....2	History.....2
Mathematics.....2	Mathematics.....2
Science.....1	Science.....1
	Elective.....1

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF ARTS

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		Page	Course			Page	Course
Latin	5	161	I	Latin	5	161	I
Greek	4	156	I	Greek	4	156	I
English	3	152	I	English	3	152	I
History	4	158	I	History	4	158	I
Elocution	1	151	III	Elocution	1	151	IV

SOPHOMORE YEAR

Latin	5	162	II	Latin	5	162	II
Greek	4	156	II	Greek	4	156	II
Philosophy	4	178	I	Philosophy	4	178	I
English	3	152	II	English	3	152	II
Elocution	1	152	VIII	Elocution	1	152	VIII

JUNIOR YEAR

Latin	5	162	III	Latin	5	162	III
Greek	4	156	III	Greek	4	156	III
Philosophy	4	179	II	Philosophy	4	179	II
English	3	152	III	English	3	152	III
Elocution	1	151	VI	Elocution	1	151	VI

SENIOR YEAR

Latin	4	162	IV	Latin	4	162	IV
Greek	4	157	IV	Greek	4	157	IV
Philosophy	4	179	III	Philosophy	4	179	III
English	3	153	IV	English	3	153	IV
Elocution	1	151	VII	Elocution	3	151	VII

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF LETTERS

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		Page	Course			Page	Course
English	3	152	I	English	3	152	I
Latin or	5	161	I	Latin or	5	161	I
Elective	5			Elective	5		
French or	5	187	II	French or	5	187	II
German	5	156	II	German	5	156	II
History	4	158	I	History	4	158	I
Elocution	1	151	III	Elocution	1	151	IV

SOPHOMORE YEAR

English	3	152	II	English	3	152	II
Philosophy	4	178	I	Philosophy	4	178	I
Latin or	5	162	II	Latin or	5	162	II
Elective	5			Elective	5		
French or	5	188	III	French or	5	188	III
German	5	156	III	German	5	156	III
History	3	158	II	History	3	158	II
Elocution	1	152	VIII	Elocution	1	152	VIII

JUNIOR YEAR

English	3	152	III	English	3	152	III
Latin or	5	162	III	Latin or	5	162	III
Elective	5			Elective	5		
Philosophy	4	179	II	Philosophy	4	179	II
History	4	158	III	History	4	158	III
Elocution	1	151	VI	Elocution	1	151	VI

SENIOR YEAR

English	3	153	IV	English	3	153	IV
Latin or	4	162	IV	Latin or	4	162	IV
Elective	5			Elective	5		
Philosophy	4	179	III	Philosophy	4	179	III
Elective	4			Elective	4		
Elocution	1	151	VII	Elocution	1	151	VII

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		Page	Course			Page	Course
History	4	158	I	History	4	158	I
English	3	152	I	English	3	152	I
French or	5	187	II	French or	5	187	II
German	5	156	II	German	5	156	II
Polit. Science	4	184	I	Polit. Science	4	184	I
Elocution	1	151	III	Elocution	1	151	IV

SOPHOMORE YEAR

History	4	158	II	History	4	158	II
Polit. Science	4	184	II	Polit. Science	4	185	IIIa
Philosophy	4	178	I	Philosophy	4	178	I
English	3	152	II	English	3	152	II
German or	4	156	III	German or	4	156	III
French	4	188	III	French	4	188	III
Elocution	1	152	VIII	Elocution	1	152	VIII

JUNIOR YEAR

English	3	152	III	English	3	152	III
Polit. Science	4	185	IIIb	Polit. Science	4	185	IV
Philosophy	4	179	II	Philosophy	4	179	II
History	4	158	III	History	4	158	III
Elocution	1	151	VI	Elocution	1	151	VI

SENIOR YEAR.

History	3	159	IV	History	3	159	IV
Political				Political	4	186	VIII
Science	4	186	V, VI	Science	2	186	VII
Philosophy	4	179	III	Philosophy	4	179	III
English	3	152	III	English	3	152	IV
Elocution	1	151	VII	Elocution	1	151	VII

THE DEPARTMENT OF JOURNALISM

Special attention is called to the fact that early in the year 1912 Mr. Max Pam of Chicago established a Chair of Journalism in the University and made possible a special program of studies leading to the degree of Bachelor of Philosophy in Journalism. The program is outlined on the next page.

In accordance with Mr. Pam's purpose in founding this chair, the program is designed to prepare young men technically for Journalism and at the same time equip them with the essentials of a liberal education. It is hoped that graduates of this course will have acquired such familiarity with the practical work of newspaper making as will render their services immediately valuable; at the same time they are required to be well grounded not only in the ethics of their profession but in general philosophy, in language study, in the principles of economics and in world politics as well as the particular currents in the national life of our own country.

The entrance requirements are practically the same as for the other departments in the college of Arts and Letters, but the Director of Studies shall have power to admit as a special student any young man who is believed capable of profiting by the work of the course.

Practical experience in newspaper work will be furnished by the course itself. There are opportunities for experience as local correspondents of the large newspapers in Chicago, Detroit, Indianapolis and other cities. The *Scholastic*, a weekly publication, founded in 1867 and issued at the University, affords excellent opportunity for editorial writing and department work.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY IN JOURNALISM.

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Journalism	2	160	I	Journalism	2	160	I
English	3	152	I	English	3	152	I
Pol. Science	4	184	I	Pol. Science	4	184	I
History	4	158	I	History	4	158	I
French or German	5	187	II	French or German	5	187	II
Elocution	1	151	III	Elocution	1	151	IV

SOPHOMORE YEAR

Journalism	5	161	II	Journalism	5	161	II
English	3	152	II	English	3	152	II
Pol. Science	4	184	II	Pol. Science	4	185	IIIa
Philosophy	4	178	I	Philosophy	4	178	I
History	3	158	II	History	3	158	II
Elocution	1	152	VIII	Elocution	1	152	VIII

JUNIOR YEAR

Journalism	5	161	III	Journalism	5	161	III
English	3	152	III	English	3	152	III
Pol. Science	4	185	IIIb	Pol. Science	4	185	IV
Philosophy	4	179	II	Philosophy	4	179	II
History	4	159	IV	History	4	159	IV
Elocution	1	151	VI	Elocution	1	151	VI

SENIOR YEAR

Journalism	5	161	IV	Journalism	5	161	IV
Law (elements)	3			Pol. Science	2	186	VII
Pol. Science	4	185	V, VI	Pol. Science	4	186	VIII
Philosophy	4	179	III	Philosophy	4	179	III
Elocution	1	151	VII	Elocution	1	151	VII

COLLEGE OF SCIENCE

DEPARTMENT OF BIOLOGY

DEPARTMENT OF CHEMISTRY

DEPARTMENT OF PHARMACY

THE COLLEGE OF SCIENCE

The College of Science was established as a distinct department of the University in 1865. The curriculum of the student was largely elective for the three succeeding years, but in 1867 there was formed the group of prescribed courses now known as the Program of General Science. Six programs are now offered to undergraduate students. The degrees under charge of the Faculty in this college are the ordinary degrees of Bachelor of Science, Bachelor of Science in Biology, Bachelor of Science in Chemistry, Bachelor of Science in Pharmacy, Graduate in Pharmacy and Pharmaceutical Chemist. The Master's degree is conferred under the usual conditions.

THE BIOLOGICAL LABORATORIES

The department of Biology occupies the second floor of Science Hall, and consists of four large lecture rooms and laboratories well ventilated and lighted. There are also private laboratories set apart for graduate students. The lecture rooms are furnished with charts and models necessary in teaching the different courses. The arrangement of windows is such that the room can be easily darkened so that stereopticon and lantern slides on the subject of botany, zoology and physiology may be used. The laboratories are equipped with compound and dissecting microscopes. In each room there is a library of works of reference pertaining to biological subjects. The general laboratory of microscopy, histology and embryology is supplied with compound microscopes and the equipments indispensable in these courses. The zoological collection fills sixteen large cases and represents typical forms

of all the orders and genera of vertebrate and invertebrate animals.

For work in anatomy, besides a large collection of charts, there are anatomical models of all the parts of the human body, which can be taken apart for close study. Besides there are several mounted and unmounted human skeletons. Students pursuing courses in human anatomy at the University study under a practicing surgeon and have the privilege of attending surgical clinics in St. Joseph Hospital of South Bend.

The bacteriological laboratory is completely equipped with compound microscopes, incubators, sterilizers, and all the improved apparatus employed in thorough and careful work in bacteriology. Apart from the others is a laboratory of photo-micrography which contains a perfect photo-micrographic instrument for experimentation, photographing microscopic objects, making lantern slides, etc. A large and fully equipped dark room adjoins this laboratory.

THE BOTANICAL LABORATORY

The Botanical Laboratory occupies the northwest end of Science Hall. It is well lighted and particularly well adapted to microscopical and histological work. The department is supplied with the usual requisites of a working laboratory such as compound microscopes and accompaniments for each student, the utensils and apparatus necessary for embedding by the paraffin, celoiden, soap methods, and mounting of preparations by the balsam, Venetian turpentine and glycerine methods. There are besides, microtomes, camera lucida, micrometers and aquaria for plant cultures so that the typical algae and fungi may be had alive for laboratory use in all stages of development through-

out the year. Special devices for the regulating and modifying of artificial light are at hand enabling the student to work on dark as well as clear days. Advanced students are supplied with Abbe condenser and oil immersion lenses. The laboratory is well stocked with histological material, and nearly all the types of common plant families of the phanogamia and cryptogamia are preserved after proper fixing. The material for demonstration of the fresh water algae is particularly good and abundant. The supply of material in Venetian turpentine and glycerine is valuable, as it supplies permanent mounts in a few minutes' work. There are also hundreds of specimens of rare and common types in paraffin. A herbarium containing over ten thousand species of flowering plants supplies the needs of the classes in systematic botany. The collection includes plants from all parts of the United States and Canada,—the Pacific coast and the Southern States are especially well represented. Besides there is a large collection of fungi, marine algae, mosses, a large collection of several hundred species of myxomycetes from the Eastern and Central States, also nearly a thousand specimens of lichens from all parts of the United States and Europe. The latter herbarium is well stocked with the local flora, and special facilities are on hand for the study of the compositae. In the museum are found specimens of American and tropical woods and fruits. The laboratory for more advanced work accommodates about twenty-five students. It is supplied with eight working tables covered with plate glass or soapstone, and each place is supplied with lock and key. The lecture room in botany is on the second floor of the building and has a seating capacity of seventy-five.

THE CHEMICAL LABORATORIES

The Chemical Laboratory building is situated in the southeastern part of the grounds and is a large three story structure devoted entirely to chemistry. On the third floor are a small stock room and the two laboratories for general and industrial chemistry, one capable of accommodating one hundred and fifty students, the other seventy. The desks are all supplied with gas, water, suction and the necessary reagents. On the side tables are general stock and general apparatus, and conveniently placed are small stands for suction and blast lamps supplied with gas, air blast, acetylene. On the third floor also is the large fan for drawing gases from the hoods, with which all the laboratories are supplied. In the middle floor are the main stock rooms where supplies can be obtained by the students. Here also are the laboratories, lecture-room, drug store, library and museum of the Department of Pharmacy. On the first floor are the laboratories for qualitative and quantitative analysis with desks to accommodate sixty-five students, and fitted with gas, suction, water and blast. Large hood accommodations are available and can be utilized to advantage because of the perfect ventilation produced by the large fans on the top floor. Two small side tables are equipped with air blasts, ordinary gas and acetylene. To the east of these laboratories are those for physical and electro-chemistry and special work such as food analysis, iron and steel analysis, gas analysis, etc. The equipment in these laboratories is quite complete. Adjoining these laboratories is a small dark room for spectroscopic and polariscopic analysis. A large lecture room to accommodate a hundred and ten students is in the south end of the first floor. It is provided with apparatus for stereop-

ticon illustrations; storage batteries, cylinders of oxygen, carbon dioxide and a complete set of charts illustrative of the processes employed in modern chemical industries. Two laboratories adjoin, one for general organic analysis, the other for special advanced work. Two wings extend from the main building,—one contains the vacuum and pressure tanks, the acetylene and gasoline gas generators, the other the balance rooms, in which are the analytical and assay balances sensitive to the one ten-thousandth of a gramme, and the library of the Department. The library contains besides the works of reference on chemistry, the principal chemical journals on file—*Berichte*, *Zentralblatt*, *the Chemical News*, *the Journal of the American Chemical Society*, *the Journal of the British Chemical Society*, *the Journal of Chemical Engineering*, *the Journal of Chemical Industries*, etc. In the large hallway are cases containing a steadily increasing collection of minerals, chemicals, designed as illustrations of the substances and processes discussed in the lectures.

The assaying and mineralogical laboratories are in a wing of Science Hall. They contain both gas and fuel furnaces for assaying gold, silver and lead ores, and also tables for blow pipe analysis. A large collection of minerals and ores serve to illustrate the processes.

THE PHYSICAL LABORATORIES

The Department of Physics occupies a suite of three rooms in the south end of the first floor of Science Hall and three laboratories in the basement. The lecture room will accommodate seventy-five students. For the work in mechanics there is the force table, inclined planes, Geneva cathetometer, capable of

measuring to one twenty-five thousandth of an inch, a large physical balance, standard kilogram, a standard metre, a dividing engine made by the Geneva society, an Atwood's machine, a compound pendulum, a break circuit recording chronograph, a powerful hydraulic press with attachments, rotary air pumps and receivers, a large clock with electrical contact pieces, several self-winding clocks, mercury barometers and two aneroid barometers.

For the work in acoustics there are a Mercadier radiophone, a set of Koenig resonators, a set of electrically operated tuning forks by Koenig, a Scott-Koenig phonautograph, an Edison phonograph of earliest type, several sets of vibrating rods, tubes and bells, a large double siren, a set of very small tuning forks producing the highest audible sounds, a set of resonators mounted together with capsules of sensitive flames arranged for the analysis of complex sounds, a set of Koenig's movable tuning forks to draw compound curves, on smoked glass, three sets of organ pipes, four sets of fine tuning forks, a set of apparatus for manometric observation of sound phenomena, a large tuning fork producing the lowest audible sound, an electric metronome, a set of mounted tuning forks carrying small mirrors arranged to perform Lissajou's experiment, producing complex curves.

For the work in light there are a complete set of apparatus by Soleil, Paris, for the measurement of the wave lengths of light by various interference methods, a set of polarization apparatus, sets of lenses and spherical mirrors, two heliostats, four spectroscopes, a polarization saccharimeter, three projecting lanterns for gas or electric light and 3,000 slides, a set of large Nicol's prisms mounted, a large compound prism to form widely dispersed spectrum, two Rowland gratings

14,000 lines to the inch, a set of photographs of solar spectrum by Rowland, several cameras with lenses and attachments, a well-equipped dark-room for photographic work, and a photometric room and equipment.

For work in heat there are Melloni's apparatus for measuring radiation, absorption and reflection of heat complete with a set of prepared substances, standard thermometers, air thermometers, a steam engine indicator, several calorimeters, apparatus for determining the coefficient of linear expansion using the optical lever method.

For work in electricity and magnetism there are an absolute electrometer, a Holz machine and apparatus for illustrating static phenomena, four induction coils, six bridges of different types, several ammeters and volt-meter, one 2,000 lb. electro magnet, standard resistance coils, a historical set of motors showing evolution of the modern machine from the early forms of the reciprocating type, ten galvanometers of various types, a complete X-ray outfit, sets of apparatus for wireless telegraphy.

ENTRANCE SUBJECTS

ENGLISH. Part of the examination is given for answering questions upon the text-books and readings required in the regular preparatory courses in English; the remainder for writing an essay.

PHYSICAL GEOGRAPHY. As given in *Tarr's* text-book or an equivalent treatise.

PHYSIOLOGY. *Martin's Human Body*, or an equivalent treatise.

ZOOLOGY, BOTANY. Elementary.

CIVIL GOVERNMENT. The American Constitution; Federal and State Governments.

HISTORY. General outlines of Ancient, Medieval and Modern History.

ALGEBRA. The whole subject as far as logarithms, as given in *Wentworth's College Algebra*, or an equivalent in the larger treatises of other authors.

GEOMETRY. Plane and Solid, including the solution of simple original problems and numerical examples, as given in the works of *Wentworth*, *Chauvenet*, *Newcomb*, or equivalent treatises by other authors.

TRIGONOMETRY. Plane and Spherical.

CHEMISTRY. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations. A course of at least fifty experiments in elementary chemistry actually performed by the pupil.

PHYSICS. Elementary. The preparation on this subject should include a course of lectures, illustrated by experiments, and recitations from a text-book similar to *Carhart and Chute's* or *Gage's*. In both chemistry and physics the laboratory note-book must be presented.

GERMAN. A two-year course in German is required. Ability to translate at sight easy German into English and easy English into German, or

FRENCH. A two-year course in French may be presented instead of German under the same conditions. Ability to translate readily, rather than an accurate grammatical knowledge, is expected.

LATIN. Grammar, complete; *Cæsar*, four books of the Gallic War; translation of English into Latin based on the text of *Cæsar*.

Subjects required for entrance to Freshman year:

English.....4	Latin.....2
Science.....2	French or German.....2
(Chemistry and Physics)	History.....2
Mathematics.....3½	Drawing.....½

PROGRAM IN GENERAL SCIENCE

The Program in General Science is calculated to afford such an acquaintance with the methods and facts of modern science as will best enable the student to fit himself, either for further study of a technical or professional kind, or for the activities of business life. The natural and physical sciences constitute the primary studies of this program. Grouped about these are such studies in English, mathematics, and modern languages, as experience has shown to be necessary for the intelligent pursuit of science and the attainment of the object of the program.

Two essays on scientific topics are required of every student in the Sophomore year and two in the Junior year.

The scientific work of the Senior year is elective. Advanced courses may be chosen in physics, chemistry, biology and mathematics.

Every candidate for a degree in the Program of General Science is required to submit, before the final examination, a written thesis upon some subject connected with the elective work of the Senior year. The subject chosen must have the approval of the professor in the course selected. The thesis shall contain no less than five thousand words, and must be satisfactory in matter and treatment.

Students who complete the required courses, pass the final examination and present a satisfactory thesis will receive the degree of Bachelor of Science.

In the schedule an hour means two sixty minute periods of laboratory work or one of lecture or recitation.

LABORATORY FEES

Chemistry I, VII, each.....	\$ 5.00
Chemistry II, III, IV, VI, VIII, IX, XIb, XIc, XIII, each,	10.00
Chemistry V.....	20.00
Physics III, Zoology I, Botany II, Mineralogy III, each..	5.00

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		Page	Course			Page	Course
Zoology	6	190	I	Zoology	6	190	I
Chemistry	4	127	II	Chemistry	4	127	II
Algebra	5	163	I	Anal. Geom.	5	163	II
Drawing	1	144	I	Drawing	2	144	II
Physiology	4	183	I	Physiology	4	183	I

SOPHOMORE YEAR

Botany	5	125	I, II	Botany	5	125	I, II
Physics	5	181	II, III	Physics	5	181	II, III
Calculus	5	163	III	Calculus	5	164	IV, V
Chemistry	4	128	V	Chemistry	4	128	V

JUNIOR YEAR

Geology	2	153	III	Geology	4	153	I
Elective	5			Astronomy	3	123	I
English	3	152	I	English	3	152	I
French or	5	187	I	French or	5	187	I
German	5	155	I	German	5	155	I
Philosophy	4	178	I	Philosophy	4	178	I

SENIOR YEAR

Philosophy	4	179	II	Philosophy	4	179	II
Electives in Science				Electives in Science			
French or	5	187	II	French or	5	187	II
German	5	156	II	German	5	156	II

PROGRAM IN CHEMISTRY

This program is intended for students who wish to obtain such a knowledge of chemistry as may fit them for professional work either in the laboratory or the class-room. Though fixed to a great extent, the schedule of work admits in the Junior and Senior year of some elective study.

Every candidate for a degree in Chemistry is required to write an essay in the Junior year on some subject connected with Chemistry and must submit, at least four weeks before the final examination, a written thesis on work covered in his Senior year. This thesis must contain at least three thousand words.

The degree of Bachelor of Science in Chemistry is given to those students who have written an approved thesis and have passed a satisfactory examination.

In the schedule, an hour means two sixty minute periods of laboratory work or one of lecture or recitation.

LABORATORY FEES

Chemistry I, VII, each.....	\$ 5.00
Chemistry II, III, IV, VI, VIII, IX, XIb, XIc, XIII, each.....	10.00
Chemistry V.....	20.00
Physics III.....	5.00
Mineralogy III.....	5.00

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Chemistry	4	127	II	Chemistry	4	127	II
Algebra	5	163	I	Anal. Geom.	5	163	II
French	5	187	I	French	5	187	I
English	3	152	I	English	3	152	I

SOPHOMORE YEAR

Chemistry	4	128	V	Chemistry	4	128	V
Calculus	5	163	III	Calculus	5	164	IV, V
Physics	5	181	II, III	Physics	5	181	II, III
Chemistry	5	128	VI	Chemistry	6	129	IX
Gas Analysis	4	129	VIII				

JUNIOR YEAR

Chemistry	7	129	IX	Chemistry	4	130	XI
Chemistry				Chemistry	3	131	XIII
Elective	5			Chemistry			
Elective	5			Elective	5		
Geology	2	154	III	Assaying	4	154	III
				Geology	4	153	I

SENIOR YEAR

Philosophy	4	179	II	Philosophy	4	179	II
History of				Chemistry			
Chemistry	3	131	XII	Elective	5		
Elective	5			Scientific			
Scientific				Readings			
Readings				in German	2		
in German	2			and French	2		
and French	2			Thesis			

PROGRAM IN BIOLOGY

The Program in Biology has been designed for students who wish to devote their time largely to biological pursuits, either as an immediate preparation for the study of medicine or veterinary science, or with a view to teaching or otherwise engaging in biological research. The students in this program are required to prepare an essay during the first term of the Junior Year on some subject pertaining to biology. Every candidate for a degree must submit before the final examinations a written thesis accompanied with original drawings. Students not preparing themselves for the medical profession may substitute for the advanced courses in anatomy and physiology equivalents from either mathematics, physics, or English literature.

LABORATORY FEES

Biological Laboratory— <i>Zoology I, II, each</i>	\$ 5.00
Botanical Laboratory— <i>Botany II, IV, each</i>	5.00
Microscopy— <i>for Courses I, II</i>	1.00
Bacteriological Laboratory— <i>Bacteriology</i>	10.00
Physics III.....	5.00
Chemistry II, VI, each.....	10.00
Chemistry V.....	20.00

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Zoology	5	190	I	Zoology	6	190	I
Chemistry	4	127	II	Chemistry	4	127	II
Microscopy	2	171	I	English	3	152	I
English	3	152	I	French	5	187	I
French	5	187	I	Drawing	1	146	IX
Drawing	1	146	IX				

SOPHOMORE YEAR

Bacteriology	5	124	I	Physiology	5	183	I
Botany	5	125	I, II	Botany	5	125	I, II
Chemistry	4	128	V	Chemistry	4	128	V
Physics	5	180	II, III	Physics	5	181	II, III
Drawing	1	146	X	Drawing	1	146	X

JUNIOR YEAR

Botany	6	126	III, IV	Botany	4	126	III, IV
Geology	2	154	III	Geology	4	153	I
Philosophy	4	180	I	Philosophy	4	178	I
Chemistry	5	128	VI	Elective	5		
English	3	152	II	English	3	152	II

SENIOR YEAR

Anatomy	2	116	I, II	Anatomy	2	116	I, II
Anatomy	4	116	III	Anatomy	4	116	III
Physiology	6	183	II	Physiology	6	183	II
Zoology	6	191	II	Zoology	6	191	II
Thesis				Thesis			

PROGRAMS IN PHARMACY

There are three programs in Pharmacy: one of two years, leading to the degree, *Graduate in Pharmacy (Ph. G.)*; and one of three years leading to the degree, *Pharmaceutical Chemist (Ph. C.)*; and one of four years leading to the degree, *Bachelor of Science in Pharmacy (B. S. in Ph.)*

ADMISSION

Applicants for admission to the short program must be 18 years of age, and must pass an examination in the subjects required for the completion of the first year of high school work. A certificate of work done equivalent to one year of high school will be accepted instead of an examination.

For admission to the three year program, in addition to the age limit, the completion of two years preparatory work is required. Evidence of this work may be shown by certificate or examination.

For admission to the four year program the same conditions apply as for entrance to the Freshman year of any regular program in the College of Science.

METHODS

The subjects studied in this department are intended to impart a thorough theoretical as well as practical knowledge of Pharmacy, the work commencing with the simplest and gradually leading up to the most difficult and complicated process.

Special attention is given to the little details, which are essential to success, in any professional work and particularly so in Pharmacy. The student is carefully drilled in store etiquette, business hints, prescription work, and dispensing. Neatness and order in all the

operations, and extreme care in the manufacture of preparations are required throughout the courses.

Attention is given to Animal extracts, Serum-Therapy, Antitoxins, new Synthetic Remedies and Alkaloidal Medication.

EQUIPMENT

Each desk is supplied with all the apparatus necessary for ordinary work. Special apparatus is furnished as required.

The department contains a fully equipped Drug Store in which the student obtains practically the same experience that he would get in actual business. A second year student is placed in full charge. He is required to furnish supplies for the department, order material, write business letters, invoice stock, etc. Then at the end of a specified time he delivers the store in good order to his successor.

About 2,000 recent prescriptions written by physicians, and taken from the files of a drug store, constitute a very important part of the equipment. Under supervision of the instructor each student is required to read them and to compound those requiring special manipulation. The reading room is supplied with all the leading pharmaceutical journals and books of reference. The Pharmacognosy room contains specimens of all the official and a great many unofficial drugs for study and identification.

THESIS

During the third year the student is required to spend at least two hours a week in original research on a subject within the domain of Pharmacy. The results of this work are carefully recorded and must be type-

written and presented to the Faculty as a requirement for graduation.

LABORATORY FEES

Pharmaceutical Laboratory II, and IV, each.....	\$20.00
Pharmaceutical Laboratory VI, and VII, each.....	20.00
Chemistry I, and VII, each.....	5.00
Chemistry III, IV, and VI, each.....	10.00
Geology III.....	5.00
Physics I.....	5.00

STUDIES PRESCRIBED FOR THE DEGREE OF GRADUATE IN PHARMACY

FIRST YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Pharmacy	8	176	I, II	Pharmacy	8	176	I, II
Chemistry	5	127	I	Chemistry	5	127	I
Microscopy	2	172	I	Chemistry	2	131	X
Bacteriology	5	124	I	Physiology	5	183	I
Arithmetic	3	180	IX	Chemistry	5	128	III
Physics	5	180	I	Physics	5	180	I

SECOND YEAR

Pharmacy	8	176	III, IV	Pharmacy	1 I	177	IV, V, VIa
Chemistry	4	128	IV	Pharmacy	2	178	XI
Chemistry	7	128	VI	Mat'ra Medica	3	177	VIII
Mat'ra Medica	3	177	VIII	Botany	5	126	I, II
Botany	5	125	I, II	Pharmacog'y	1	178	X
Pharmacog'y	1	178	X				

DEGREE: PHARMACEUTICAL CHEMIST

FIRST YEAR

Pharmacy	8	176	I, II	Pharmacy	8	176	I, II
Chemistry	5	127	I	Chemistry	5	127	I
Microscopy	2	172	I	Chemistry	2	131	X
Bacteriology	5	124	I	Physiology	5	183	I
Arithmetic	3	180	IX	Chemistry	4	128	III
Physics	5	180	I	Physics	5	180	I

SECOND YEAR

Pharmacy	8	176	III, IV	Pharmacy	1 I	177	IV, V, VIa
Chemistry	4	128	IV	Pharmacy	2	178	XI
Chemistry	7	128	VI	Mat'ra Medica	3	177	VIII
Mat'ra Medica	3	177	VIII	Botany	5	126	I, II
Botany	5	125	I, II	Pharmacog'y	1	178	X
Pharmacog'y	1	178	X				

THIRD YEAR

Pharmacy	6	177	Vib	Pharmacy	6	177	VII
Chemistry	5	130	XIc	Chemistry	5	132	XIV
Geology	2	154	III	Urine Anal.	3	129	VIIa
Elective	5			Toxicology	3	129	VIIb
Thesis	2			Elective	5		
				Thesis	2		

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACY

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Chemistry	4	127	II	Chemistry	4	127	II
English	3	152	I	English	3	152	I
Botany	5	125	I, II	Botany	5	125	I, II
German	5	155	I	German	5	155	I
Microscopy	2	172	I	Physiology	5	183	I

SOPHOMORE YEAR

Pharmacy	8	176	I, II	Pharmacy	8	176	I, II
Chemistry	4	128	V	Chemistry	4	128	V
Physics	5	181	II, III	Physics	5	181	II, III
English	3	152	II	English	3	152	II

JUNIOR YEAR

Pharmacy	8	176	III, IV	Pharmacy	1 I	176	IV, V, VIa
Chemistry	5	128	VI	Chemistry	2	128	VIc
Bacteriology	5	124	I	Geology	5	153	I
Zoology	5	190	I	Zoology	5	190	I
				Pharmacy	2	178	XI

SENIOR YEAR

Pharmacy	8	177	VIIb	Pharmacy	5	177	VII
Pharmacog'y	2	178	X	Pharmacog'y	2	178	X
Geology	2	154	III	Urine Anal.	2	129	VIIa
Elective	5			Toxicology	3	129	VIIb
Mat'ra Medica	3	177	VIII	Elective	5		
Thesis				Mat'ra Medica	3	177	VIII
				Thesis			

COLLEGE OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

DEPARTMENT OF MINING ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

THE COLLEGE OF ENGINEERING

In the industrial development of a country the engineer takes an important part. Many new industries are springing up and the great activity in those already established throughout the world creates a demand for the services of trained engineers.

The programs of studies in the five departments of engineering at Notre Dame are arranged to give a knowledge of the fundamental facts and theories that are applied in engineering work. Mathematics is foremost among these requirements. The natural sciences receive their share of attention and due importance is given to language in arranging the programs of studies.

Laboratory work and field work give a certain amount of practice in the application of the theory to actual physical conditions. These conditions are made to correspond as closely as possible to the real work of the engineer.

A student who has no liking for mathematics should not be encouraged to take up an engineering course. The successful engineer is one who thinks clearly and acts accurately. Clear thinking is necessary to master mathematical subjects and skill and accuracy are acquired by applying the results of mathematical calculations to particular practical cases in laboratory work.

Five regular programs of studies have been arranged: one leading to the degree of Civil Engineer, one to the degree of Mechanical Engineer, one to the degree of Electrical Engineer, one to the degree of Engineer of Mines, and one to the degree of Chemical Engineer.

Special Short Courses in Electrical and Mechanical Engineering are offered to accommodate those who wish

to fit themselves for practical work in the shortest possible time.

The various laboratories are equipped with the most approved forms of instruments and appliances and considerable time is given to technical work. The equipment for each department will be found described and referred to on the succeeding pages of this catalogue.

In addition to the work in the laboratories and the power plants of the University, students are taken on inspection tours to the important engineering works in the neighborhood. Several of the largest manufacturing plants in the world are in South Bend or the vicinity.

In the schedules of studies one hour of credit is given for each recitation or lecture which requires from one to two hours' preparation. Two hours actual time in laboratory work, shopwork or drawing is required for each hour on the schedule.

EXPENSES

In addition to the regular fee for matriculation, board, tuition, lodging, etc., as given on page 35, the regular students in the five Engineering Programs are required to pay laboratory fees to cover, in part, the cost of materials consumed and the deterioration of the apparatus used.

LABORATORY FEES

Assaying II.....	\$15.00
Chemistry I.....	5.00
Chemistry II, VI, VIII, XIb, XIc, XIII, XIV, XV, each,	10.00
Chemistry V.....	20.00
Crystallography IV.....	2.00
Electrical Laboratory I, II and IV, each.....	15.00
Metallurgy I.....	5.00
Mineralogy II, Sophomore Year.....	10.00
Mineralogy II, Junior Year.....	5.00

Mineralogy III.....	5.00
Petrography V.....	5.00
Physical Laboratory I and III, each.....	5.00
Physical Laboratory IV.....	15.00
Shopwork, all four-year programs, per term.....	15.00
Surveying III, V, VIII, each.....	5.00

ENTRANCE SUBJECTS

ALGEBRA. The whole subject as far as logarithms, as given in *Wentworth's College Algebra*, or an equivalent in the larger treatises of other authors.

GEOMETRY. Plane and Solid, including the solution of simple problems and numerical examples, as given in the works of *Wentworth, Chauvenet, Newcomb*, or an equivalent in treatises by other authors.

TRIGONOMETRY. Plane and Spherical.

CIVICS. The Constitution of the United States; Federal Government and State Government.

HISTORY. General outlines of Ancient, Medieval and Modern History.

GEOGRAPHY. Physical, as much as is contained in *Tarr's* text-book or an equivalent treatise.

PHYSICS. Elementary. The preparation on this subject should include a course of lectures, illustrated by experiments and recitations from a text-book like *Carhart and Chute's* or *Gage's*. Laboratory work is also required.

CHEMISTRY. The elements of Chemistry. Laboratory work required.

BOTANY, PHYSIOLOGY, AND ZOOLOGY. Elementary.

MODERN LANGUAGE. Engineering students must present a three years' course in German, French or Spanish.

ENGLISH. Part of the examination time is given for answering questions upon text-books and readings

required to be read in the preparatory courses in English; the remainder for writing an essay.

Subjects required for entrance to Freshman year:

English	4	History	2
Mathematics	3 ½	French or German	3
Science	2	Drawing	½
(Chemistry and Physics)		Elective	1

THE DEPARTMENT OF CIVIL ENGINEERING

The courses of instruction are designed to prepare students for a thorough and systematic training in the sciences and in the principles of Civil Engineering, to perform intelligently the duties of their profession, either in the office or in some of the responsible positions superintending the construction and operation of public works. To secure these results the student is given, not only a sound theoretical training in the courses of study, but he is also required to study the practical applications of the principles upon which the theory is based. The first two years are devoted to the study of mathematics and the theoretical branches. The last two years are given to the study of applied courses—practical work in the laboratory and field, as much as possible, being required throughout the course.

Sufficient instruction is given in French and German to enable the student to read easily and intelligently professional works in these languages; and the study of English is pursued until the student is qualified to prepare acceptable themes on professional subjects. Instruction based upon standard text-books on engineering is given throughout the course by means of lectures, recitations, practice in laboratory, drawing-room and field. This work is largely supplemented by assigning to the student, for solution, practical problems bearing

directly upon the subject matter discussed in the classroom and requiring original investigation, thus training the student to habits of independence and awakening his interest in the work of his profession.

The Department is provided with all the instruments necessary for effective work in the different branches of field engineering. The instrumental outfit consists of surveyors' transits, engineers' transits with levels and vertical circles attached to telescopes, also solar attachments, engineers' wye levels and a plane table with all the attachments, clinometers, chains, tapes, leveling rods, etc., and one Olson's cement testing machine. After the student is taught the use and adjustment of the instruments, surveys, elementary in character, are commenced and continued progressively until the more difficult principles and methods are understood. In a similar manner is instruction given in the courses of sanitary engineering, hydromechanics, resistance of materials, bridges and roofs, etc., thus familiarizing the student with practical engineering subjects, and the most improved method of execution and designing. A large draughting room offers facilities for the proper study of all the courses in mechanical drawing and design. The room is splendidly lighted from above, well ventilated and contains the latest form of drawing tables. There are suitable arrangements for blue-printing, both by natural and electric light.

The constantly growing city of South Bend, with a population now of sixty thousand, is one of the most important manufacturing cities in the Middle West. Some of the largest plants in the world are situated here. One of the greatest water power developments in the United States is located a few miles from the University. Special advantages are thus afforded to students for the inspection of the most modern engineering works now

completed or in process of construction. The City Engineer is one of the examining board.

A thesis on some subject approved by the head of the Department connected with the course of study, is required of each student as a condition of graduation. The thesis must embody the results of original research.

STUDIES PRESCRIBED FOR THE DEGREE OF CIVIL ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	163	I	Anal. Geom.	5	163	II
English	1	152		English	1	152	
French	4	187	I	French	4	187	I
Chemistry	4	127	II	Chemistry	4	127	II
Drawing	3	144	I	Drawing	3	144	II
				Surveying	3	133	II, III

SOPHOMORE YEAR

Calculus	5	163	III	Calculus	5	164	IV, V
Des. Geometry	3	133	I	Des. Geometry	3	133	I
Surveying	5	135	IV V	R.R. Survey'g	5	134	VII, VIII
Geodesy			VI	Physics	5	181	II, III
Physics	5	181	II, III	Drawing	1	145	V
Drawing	1	145	V				

JUNIOR YEAR

Analytic Mechanics	5	135	VIII	An. Mechanics	2	135	VIII
Elective	4			Mechanics of Materials	3	136	X
English	3	152	II	Astronomy	3	123	I
Geology	2	154	III	English	3	152	II
Stereotomy	3	145	VI	Geology	4	153	I
				Drawing	3	145	VII

SENIOR YEAR

Engineering	5	138	XII	Engineering	5	138	XII
Hydromechan.	3	140	XVI	Hydromechan.	3	140	XVI
Bridges, Roofs	5	139	XIV	Graph. Stat.	5	139	XV
Sanitary Eng.	2	138	XIII	Sanitary Eng.	2	138	XIII
				Roads, Pav'mt	4	137	XI
				Thesis			

THE DEPARTMENT OF MECHANICAL ENGINEERING

The Program of studies in Mechanical Engineering, leading to the degree of Mechanical Engineer, is open to young men who wish to prepare themselves for the designing of machinery, with its appurtenances, and for the successful management of power plants. As the program requires a thorough knowledge of pure and applied Mathematics, as well as of Physics, only those capable of adapting themselves to these requirements should take it up. The program of the department is modeled in the twofold belief that a thorough fundamental training is best secured by a study of the practical application of the principles involved, as well as of the theoretical principles.

The work of the department, conducted in connection with other departments elsewhere described, consists of the study, by text-book or lectures, of the materials used in mechanical engineering, accompanied by the science of pure mechanical kinematics, which traces the motions of connected parts without reference to the cause of such motions, to the work done or energy transmitted. This is succeeded by machine design, which is a direct development of kinematics, and the course continues throughout the Junior and Senior years.

The courses in Shopwork are most complete. The first year's work is confined to practice in the woodshop, in which the principles of carpentry, turning, and pattern-making are taught. When the students have become sufficiently skilled in woodwork, they take up the work of the foundry, blacksmith shop, and machine shop. A systematic course of training is provided, which advances the student by easy steps until he has mastered all the details of the work.

The latter part of the Senior year is largely taken up in the preparation of a graduation thesis. Here especially the student is taught to depend as much as possible upon his own resources and abilities in exercising his ingenuity. This is the culminating effort of the program, embodying its chief results, and is expected to show considerable originality.

Every possible advantage is given the student wishing to specialize in some of the branches of engineering, toward furthering his knowledge and ability in the particular field desired. He may take up general machine design, steam engine design, specifications and contracts, installation and erecting, original research or gas engine design and operation. A systematic curriculum of study will be outlined in each individual case leading to a complete and proficient knowledge of the work undertaken.

Access may be had to all machinery and apparatus of the University contained in the various power plants and laboratories elsewhere described, and every effort is made by the authorities to make the work as comprehensive as possible.

The laboratories and shops are equipped with all necessary apparatus and machinery. The wood shop is supplied with modern work-benches fully equipped with the smaller tools necessary for carpentry, lathes for turned work, two jig saws, a pony planer, a joiner, an edge moulder and sharper, a universal trimmer, circular saw with dado and drilling attachments and band saw, the whole forming an adequate equipment for a thorough mastery of joinery, scroll work and pattern making.

The power for operating the machine shop is derived from the electric plant of the University, two ten-horse power motors being used for this purpose, from which power is transmitted to the various machines by line

shafting running the entire length of the building. The latest improved lathes have been provided, nine in number, varying from a five-inch swing in the smallest to a large engine lathe with sixteen foot bed, having a capacity for work twenty-eight inches in diameter. Two drill presses, a large planer, a shaping machine and a Brown and Sharp milling machine complete the outfit, thus making the machine shop a model of its kind. There have been completed lately in the machine shop seven new screw cutting lathes of fourteen-inch swing, a high speed bench hand lathe, one twenty-eight inch Sibley and Ware drill press, one horizontal 8x12 slide valve steam engine and a wood milling machine. The equipment is added to regularly, and recently a Seneca Falls lathe of fourteen inch swing and eight foot bed, a Crown high speed lathe, a Toledo punch press and a complete new set of chucks, drills, taps, mandrels and lathe dogs have been installed to meet the additional requirements of the courses. It is the policy of this department to refrain as much as possible from exercise work, and each student is usually taking part in the construction of some new machine or engaged on general repair work for the University, a plan which is regarded superior to a fixed routine of exercises.

The blacksmith shop has the usual complement for teaching forging, annealing, welding and tool-making. In the foundry work the student is instructed in the proper disposition of gates and sprues, the mixing of sand, setting up and drawing simple and complicated patterns and core making. This is supplemented with lectures on the proper mixing and heating of cast iron for the various purposes for which it is used.

In addition to the facilities afforded by the shops, the engineering students have access to the steam and power plants of the University which have been recently

remodeled and made to compare favorably with the best contemporary practice. The main steam plant contains two batteries of ten horizontal tubular boilers, aggregating 1200 horse power. In connection with the boilers is installed the necessary testing apparatus as follows: a Worthington hot water meter for measuring the amount of feed water, a feed water thermometer for getting temperature of same, a high range thermometer for temperature of generated steam, a throttling calorimeter for ascertaining the quality of steam and an automatic recording pressure gauge giving a continuous record of the boiler pressure. Provision is made for finding the temperature and pressure of the flue gases by means of a pyrometer and draught gauge and for obtaining samples of flue gas for analysis with Fisher's analysis apparatus. These, with a Carpenter coal calorimeter for determining the heating value of fuel, comprise a full and complete equipment for giving the student an intimate knowledge of the practical part of boiler management and testing. A Webster feed water and purifier, two compound duplex pumps, two vacuum pumps working on the heating system, two large Worthington fire pumps 16x9 by 12 with a capacity of 1500 gallons per minute, with numerous separators, steam traps, automatic reducing valves, etc., complete the apparatus in the main steamplant. A McEwen high speed automatic engine, an Armington and Sims engine of smaller type and several low speed horizontal engines with polar and roller planimeters, indicators, reducing wheels, slide rules and other necessary instruments, are used in studying the operation of the steam engine, distribution and economy of steam, regulation, valve setting and heat wastes.

There have been recently donated to the mechanical laboratory about four hundred brass and iron fittings

used in steam and gas engineering, including feed water injectors, sight feed lubricators, oil cups, safety valves, relief valves, different varieties of globe valves, gate valves, tees, elbows, crosses, unions, bushings and reducers. Many of these have been sectioned to show the dimensions, and facilitate a study of the internal structure and arrangement of parts.

In the gas engine laboratory are installed one horizontal eleven horse power four cycle engine completely equipped for experimental runs, with indicator reducing motion, prony brake, scales and thermometers, a five horse power two-cycle vertical gas engine of the marine type, a four horse power horizontal four cycle gasoline engine with circulating pump and cooling tower, one Motsinger auto-sparker with induction coil, one Apple ignition dynamo with storage battery, two Hendricks automatic igniters together with carburettors, spark plugs, spark coils, indicators, and all necessary equipment for a complete study of the gas engine.

Recent additions include the latest type Kingston carburettor and muffler, a National storage battery, Pittsfield induction coils and dash coils, two Wizard magnetos with brass armored spark coils, one four engine cylinder distributor and a number of improved standard and meter spark plugs.

A set of castings for an eight horse power engine to be operated by alcohol has been placed in the machine shop, and the work of designing and building the engine will be undertaken by the students.

In the department library, standard authors may be consulted and the current literature on engineering topics is kept on file for reference, as well as a complete line of trade catalogues.

STUDIES PRESCRIBED FOR THE DEGREE OF MECHANICAL ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a	SEE FOR DESCRIPTION		SUBJECTS: FIRST TERM.	Hrs. a	SEE FOR DESCRIPTION	
		Wk.	P'ge			Course	Wk.
Algebra	5	163	I	Anal. Geom.	5	163	II
French	4	187	I	French	5	187	I
Drawing	3	144	I	Drawing	3	144	II
Chemistry	4	127	II	Chemistry	4	127	II
Shopwork	3	170	XIVa	Shopwork	3	170	XIVb
English	1	152		English	1	152	

SOPHOMORE YEAR

Calculus	5	163	III	Calculus	5	164	IV, V
Drawing	2	146	VIII	Drawing	2	146	VIII
Chemistry	4	128	V	Chemistry	4	128	V
Physics	5	181	II, III	Physics	5	181	II, III
Shopwork	3	170	XIVc	Shopwork	3	170	XIVd

JUNIOR YEAR

An. Mechanics	5	135	VIII	Hydromechan.	2	140	XVI
Kinematics	4	167	V	Mech's of Mat.	3	136	X
English	3	152	I	Mach'n Design	3	167	VI
Physics	2	181	IV	Physics	2	181	IV
Shopwork	3	170	XIVe	Valve Gears	1	167	VII
				English	3	152	I
				Shopwork	3	170	XIVf

SENIOR YEAR

Materials of Engineering	2	165	II	Steam Engine Design	4	166	III
Thermodynam.	5	165	I	Steam Boilers	3	166	IV
Steam Engine Design	4	166	III	Thermodynam.	5	165	I
Mechan'l Lab.	3	168	VIII	Thesis			
Shopwork	3	170	XIVf	Elective	4		

TWO-YEAR PROGRAM IN MECHANICAL ENGINEERING

*Theory, Design and Operation of Gas, Oil
and Vapor Engines.*

This program is devoted exclusively to the study of explosive motors, in theory, design, construction and operation.

The rapid progress made in recent years in the design of gas engines, together with their adaptation to the supplying of power for almost every requirement, has led to the establishment of this program for young men wishing to make a special study of this branch of engineering.

The essential work of the first year consists of a general descriptive study of the different types of engines with discussions on the general management, operations, care and special uses to which this type of motor may be applied. During the second year the general theory of the gas engine is studied and the design of an engine for specific purposes is undertaken by each student.

The laboratory work will consist in part of indicator practice, determination of mechanical and thermodynamic efficiency, speed regulation, and economy. Experiments in flame, electric and hot tube ignition, operation of vaporizers and carburetors, construction of spark coils and care of motors will complete the work.

The courses in shopwork are intended to give practical application to the theories advanced in the class room by the complete building and testing of a gas engine of a design to be selected by the demonstrator. Each student is required to prepare the patterns and core-boxes, machine the castings and forgings, assemble the complete engine and submit a comprehensive report of

a test on the machine constructed. If the report proves satisfactory a certificate of proficiency is given to the student and the gas engine becomes his own property.

For admission to this program the student must have completed courses XIVa and XIVb in shopwork and must certify by examination or certificate evidence of a knowledge of algebra as far as logarithms, plane geometry, and his further ability to pursue the studies of the first year. Candidates shall also write a short essay, which must be satisfactory in spelling, sentence and paragraph construction.

The equipment and facilities for the courses will be found described on pages 74-78.

STUDIES PRESCRIBED FOR SHORT PROGRAM IN MECHANICAL ENGINEERING

FIRST YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Geometry	5	209	E	Trigonometry	5	210	F
Drawing	2	142	I	Drawing	3	142	II
Shopwork	3	170	XIVa	Shopwork	3	170	XIVd
Chemistry	5	127	I	Chemistry	5	127	I
Physics	5	180	I	Physics	5	180	I
Gas Engines	5	168	X	Vapor Engines	5	168	X

SECOND YEAR

Motor Design	15	169	XI	Motor Design	10	169	XI
Laboratory	3	169	XIII	Laboratory	3	169	XIII
Gas Engine	3	169	XII	Gas Engine	3	169	XII
				Engines and Boilers	3	168	IX

THE DEPARTMENT OF ELECTRICAL ENGINEERING

The remarkable development of electrical industries during the past few years has created a demand for men skilled in the theory and practice of electrical and mechanical work. The study of the subjects arranged in the program of Electrical Engineering is intended to give a general education as well as a special training in the technical branches involved in the various practical applications of electricity in industrial operations.

General theory is given in lectures and by recitations from standard text-books. In the laboratories and shops the operations explained in the class-room are performed by the student, in doing which he acquires skill in handling tools and instruments, and obtains a working knowledge of the principles involved. Careful records of the work done in laboratories are kept by the student and are handed in for suggestions and corrections at the end of every week.

The University is located near a great manufacturing centre in the growth of which electricity is taking a very prominent part. Electric power generated by steam is now being distributed and utilized in several large plants, some using the three phase alternating system, while others are using the direct current. One of the largest water power developments in the Middle West is situated within a few miles of the University. From this establishment we receive three phase alternating currents which furnish light for our buildings and grounds, and power for driving motors in our shops and printing offices, etc., all of which are operated by electricity.

There are numerous other transmission lines and electrical power plants operated by water power within

a short distance. Our students visit all of these plants accompanied by an instructor who points out the applications of the text-book theory in the design of electrical apparatus and its operation under actual working conditions.

Each candidate for graduation must present at the end of the Senior year an acceptable thesis embodying the results of an extended original research on an engineering subject, chosen at the beginning of the year, with the approval of the head of the department. The descriptive part must be typewritten on legal cap paper, and bound in book form together with the drawings.

The equipment for the laboratory work in electrical engineering includes dynamos typical of the various classes, accessory apparatus and measuring instruments as follows: A three phase A. C. induction motor arranged to operate on single phase circuits with a condenser compensator, a high frequency 1000 V. 33 K. W. composite wound Wood alternator of the latest type with exciter and a full set of switchboard instruments, several transformers of different capacity, a high tension transformer for testing insulation, an Edison bipolar 15 K. W. 125 V. generator, a Thompson-Houston arc light machine with regulator and fifteen lamps, a Wood arc transformer for testing insulation, an Edison bipolar 15 machine capacity 25 lights, an Edison bipolar 3 K. W. 125 V. dynamo with special winding, a Van Depoele compound wound dynamo, a special A. C. 5 H. P. dynamo or rotary converter, a series wound dynamo with wrought iron field, number of small motors, a forty horse power high speed automatic engine, a set of inclined coil alternating current portable instruments voltmeter, ammeter and wattmeter, telegraphing relays, sounders, switchboard, etc., telephone apparatus

including subscribers sets of various modern types, a fifty drop manual switchboard complete and a lot of separate drops, jacks, switches, lightning arresters, etc., automatic telephone switchboard containing first and second selector and connector switches, interrupter heat coils, etc., and three subscribers sets—with this apparatus all the operations involved in the operation of a 10,000 system may be performed, a complete central energy switchboard, several lines and subscribers sets and a selective signaling four party line outfit; a collection of historical sets including Reis' transmitter and receiver, a standard portable bridge, a common portable bridge, a testing battery, a power or foot lathe with wood turning tools, drills and hand tools for metals, a set of tools for metal working, a calibrating lamp rack, a D'Arsonval and common galvanometers, Ballistic galvanometer, standard condenser, etc., for capacity work, resistance boxes, standard meghoms, etc., high resistance Thompson galvanometer, standard cells, voltmeter arranged for the comparison on incandescent lamps, a plug switchboard controlling all circuits, a small engine belted to shafting to drive a plating dynamo and a buffer for cleaning and polishing work to be plated, solution tank, etc.,—in all, a complete outfit for electrotype work, a hot wire ammeter, twelve ammeters and voltmeters mostly of the Western type for direct current measurements, a set of wood working tools, a Kohlrausch bridge for measuring battery resistance, etc., a lot of arc lamps series and constant potential open and enclosed arcs of various wattmeters of various types, a collection of motor starting rheostats, several sets of parts of incandescent lamps showing the various stages in their manufacture, a large collection of porcelain insulators used in electrical work including a lot of insulators for high tension transmission lines, a

lot of armature core disks, transformer core stampings, formed coils, brush holders, pole pieces, samples of insulation, commutator segments, etc., used in dynamos of good design, donated by leading manufacturers of electrical machinery, a case of marked samples of wire insulators, lamps and other construction materials, a library of practical technical books of reference and files of leading periodicals and trade publications, a Cooper Hewitt mercury vapor lamp, a high frequency Tesla coil and condenser, a working model of the induction armature winding model mounted to rotate in bipolar and multipolar fields, a storage battery 25 cells with universal switch to connect for various voltages.

For the work of electricity and magnetism in the courses in physics there are the following: An absolute electrometer, a Holtz machine and apparatus for illustrating static phenomena, four induction coils, six bridges of different types, several ammeters and voltmeters, one 2,000 lb. electro magnet, standard resistance coils, a historical set of motors showing evolution of the modern machine from the early form of the reciprocating type, ten galvanometers of various types, a complete X-ray outfit, a set of apparatus for wireless telegraphy. For further apparatus consult pages 53, 54 and 55 of this catalogue.

For the work in chemistry, drawing and shopwork, the equipment and facilities will be found described on pages 52, 73 and 76.

STUDIES PRESCRIBED FOR THE DEGREE OF MECHANICAL ENGINEER IN ELECTRICAL ENGINEERING

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	163	I	Anal. Geom.	5	163	II
French	4	187	I	French	4	187	I
Drawing	3	144	I	Drawing	3	144	II
Chemistry	4	127	II	Chemistry	4	127	II
Shopwork	3	170	XIVa	Shopwork	3	170	XIVb
English	1	152		English	1	152	

SOPHOMORE YEAR

Calculus	5	163	III	Calculus	5	164	IV, V
Des. Geometry	2	146	III	Des. Geometry	2	146	III
Physics	5	181	II, III	Physics	5	181	II, III
Shopwork	3	170	XIVc	Shopwork	3	170	XIVd
English	3	152	I	English	3	152	I

JUNIOR YEAR

Analytic Mechanics	5	136	VIII	Hydromechan.	2	140	VIII
				Mech's of Mat.	3	136	VIII
Kinematics	4	167	V	Mach'n Design	3	166	VI
Physics	2	181	IV	Electrical			
Shopwork	3	170	XIVe	Measurement	1	182	V
Elective	4			Shopwork	3	182	XIVf
				Calorimetry	1	182	VI
				Elective	4		

SENIOR YEAR

Dynamo	4	148	III	Dynamo Mach	4	148	III
Machinery				4	148	IV	
Thermodynam.	5	166	I	Designing	2	148	V
Electrical Lab.	4	148	IV	Thermodynam.	5	165	I
Designing	3	148	V	Illuminating			
Power	1	149	VIII	Engineering	1	150	XII
Transmission							
Electric Ry.							
Thesis			IX	Thesis			

SHORT PROGRAM FOR APPLIED ELECTRICITY

Students who do not wish to take the languages and higher mathematics required in the regular four-year program should take up the Short program, which may be completed in two years. The studies are arranged to give an accurate knowledge of the fundamental theories of electricity and magnetism, as well as a certain amount of skill in handling electrical machinery and appliances. Algebra, geometry, trigonometry, and elementary physics are included, for they are necessary in order to carry on successfully the practical work of designing, manufacturing and testing or operating electrical apparatus. Training in this practical work is given in the drafting room, the machine shops, and in the electrical and physical laboratories.

The actual conditions of the commercial application of electricity to the distribution of light and power are learned by testing, repairing and making additions to the University plant, and by visiting the numerous electric establishments in the vicinity, accompanied by an instructor.

The study of the principles of mechanical drawing is taken up early in the program and sufficient practice is given to enable the student to make working drawings and to follow them in the construction of apparatus in the shops and laboratories.

Applicants for admission to the Short program should be at least 17 years of age. They should have a fair knowledge of the subjects taught in the common schools, especially arithmetic and algebra, as far as logarithms. They shall also write a short essay which must be satisfactory in spelling, punctuation, sentence and paragraph construction.

When the required studies have been satisfactorily completed, a certificate of proficiency is issued.

The laboratory fees for students who are taking the regular work in the program, according to the following schedule, after they have finished all the work required for entrance, shall be as given on page 70.

STUDIES PRESCRIBED FOR SHORT PROGRAM IN APPLIED ELECTRICITY

FIRST YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	209	C	Geometry	5	209	D
Drawing	3	142	I	Drawing	3	142	II
Shopwork	3	170	XIVa	Shopwork	3	170	XIVb
Physics	5	180	I	Physics	5	180	I
Applied Electricity	5	147	I	Applied Electricity	5	147	I

SECOND YEAR

Trigonometry	5	210	F	Engines and Boilers	3	168	IX
Designing	3	148	V	Designing	3	148	V *
Shopwork	3	170	XIVc	Shopwork	3	170	XIVd
Dynamo Machinery	5	148	III	Dynamo Machinery	5	148	III
Applied Electricity	5	147	II	Applied Electricity	5	147	II

THE DEPARTMENT OF MINING ENGINEERING

The wonderful growth and expansion of the mining industry, not only in this country but in Mexico, Central and South America, has created a constant demand for trained men who have a thoroughly practical as well as theoretical knowledge of mining operations.

The aim of this department is to give the student sufficient training in the various technical branches of mining to enable him to project and successfully carry through a mining enterprise.

The course of studies leading to the degree of Mining Engineer includes the essential subjects of Mechanical Engineering, particularly those which have special prominence in mining work; for the economical operation of any mine depends to a great extent upon the judicious selection and proper operation of the machinery in the power plant, mill and smelter. Likewise the subjects of Civil Engineering with but few exceptions, are embraced in the mining course, for the reason that many of the problems of Civil Engineering must be solved in the laying out and directing of mining work. Plans and surveys of the surface improvements and underground workings of a mine are made by the Mining Engineer.

In addition to these subjects the course includes the following special branches: Crystallography, Mineralogy, Petrography, Physical and Chemical Geology, Economic Mining Geology, Metallurgy, Ore Dressing, Assaying and a thorough study^{of} of Inorganic Chemistry in its application to mining and metallurgy.

Throughout the course the object is not only to present clearly the theory underlying each subject, but to fix it in the mind of the student by practical work in the laboratory, shop, drafting room and in

trips to the mining districts where the student becomes familiar with the practical application of the principles laid down in the text-book and lectures.

The subject of the thesis required in this course must be along the line of mining and consist of original research work in one of its special branches, to be approved by the head of the department.

THE DEPARTMENT OF CHEMICAL ENGINEERING

Chemical manufacture has developed so rapidly and grown so exacting that there has arisen a demand for men who not only can create and improve chemical processes strictly so-called, but who can deal with the problems of construction and maintenance as far as they are related to the chemical industries. To prepare young men for such work the course in Chemical Engineering has been designed. The student taking up this course is given a thorough training in chemical principles similar to that outlined in the Course in Chemistry except that the laboratory period is somewhat shortened. To this training is added a certain amount of the theory and laboratory practice in Mechanical Engineering sufficient for the needs of chemical industries, together with a consideration of electrical currents as used in chemical manufacture.

STUDIES PRESCRIBED FOR THE DEGREE OF MINING ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM.	Hrs. a	SEE FOR DESCRIPTION		SUBJECTS: FIRST TERM.	Hrs. a	SEE FOR DESCRIPTION	
		Wk.	P'ge			Course	Wk.
Algebra	5	163	I	Anal. Geom.	5	163	II
Chemistry	4	127	II	Chemistry	4	127	II
Drawing	3	144	I	Drawing	3	144	II
Shopwork	3	179	XIVa	Shopwork	3	170	XIVb
English	3	152	I	English	3	152	I
				Surveying	3	133	II, III

SOPHOMORE YEAR

Calculus	5	163	III	Calculus	5	164	IV, V
Surveying	5	135	IV V	Adv. Survey'g	5	135	VII VIII
Geodesy			VI	Physics	5	181	II, III
Physics	5	181	II, III	Chemistry	4	128	V
Chemistry	4	128	V	Drawing	1	147	V
Drawing	1	147	V	Geology	5	153	I
Mining Eng.	5	172	I	Mining Eng.	5	172	I

JUNIOR YEAR

Anal. Mech.	5	136	IX	Mech. of Mats.	3	136	X
Mineralogy	3	154	II	Hydromechan.	2	140	XVI
Drawing	3	147	VIII	Mineralogy	5	154	II
Shopwork	3	170	XIVe	Drawing	2	147	VIII
Crystall'phy	5	154	IV	Shopwork	3	170	XIVf
Elective	4			Chemistry	5	132	XV
				Mine Surveying	3	172	

SENIOR YEAR

Ore Dressing	3	171		Assaying	8	163	II
Metallurgy	3	163	I	Economic			
Physical and				Mining Geol.	2	153	VII
Chem. Geol.	3	155	VI	Graphic Statics	5	139	XV
Petrography	2	154	V	Petrography	2	154	V
Thermodynam.	5	165	I	Thesis			
Materials of							
Engineering	2	165	II				
Shopwork	3	170	XIVf				

SUMMER WORK.

(To be done during the summer preceding the Senior Year.)

This course consists of actual Mining Engineering practice in the mines of the lake Superior district, under the direction of the head of the department. Each student is required to make a complete, accurate underground survey with a mining transit, connecting the mine traverse with one on surface, through vertical and inclined shafts. A study of the different methods of mining in several mines are made with special attention given to Geology in its relation to economic mining; ore dressing mills and metallurgical plants are carefully inspected to familiarize the student with the best concentrating and smelting methods. Sixty hours a week for four weeks.

STUDIES PRESCRIBED FOR THE DEGREE OF CHEMICAL ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a	SEE FOR DESCRIPTION	
		Wk.	P'ge			Course	Wk.
Algebra	5	163	I	Anal. Geom.	5	163	II
Chemistry	4	127	II	Chemistry	4	127	II
Drawing	3	144	I	Drawing	3	144	II
French	4	187	I	French	4	188	I
English	3	152	I	English	3	152	I
Shopwork	3	170	XIVa	Shopwork	3	170	XIVb

SOPHOMORE YEAR

Calculus	5	163	III	Calculus	5	164	IV, V
Physics	5	182	II, III	Physics	5	181	II, III
Drawing	2	145	III	Drawing	2	145	III
Chemistry	4	127	V	Chemistry	4	128	V
Shopwork	3	170	XIVc	Shopwork	3	170	XIVd

JUNIOR YEAR

Chemistry	5	128	VI	Chemistry	5	132	XV
Physics	2	182	IV	Physics	2	182	IV
Anal. Mech.	5	135	VIII	Mech. of Mats	3	168	X
Kinematics	3	167	V	Hydromechan	2	140	XVI
Drawing	2	148	VIII	Mach. Design	3	167	VI
Elective	4			Valve Gears	1	167	VII
				Chemistry	2	129	VIII
				Steam Boilers	3	166	IV

SENIOR YEAR

Chemistry	6	127	IX	Chemistry	7	129	IX
Chemistry	3	129	XIII	Chemistry	4	130	XI
Chemistry	5	129	XIV	Chemistry	5	131	XIV
Thermodynam.	5	162	I	Thermodynam.	5	165	I
Mech'l. Lab.	3	165	VIII	Thesis			

THE COLLEGE OF ARCHITECTURE

Architecture is, fundamentally, a fine art; but it is a fine art that may be expressed on so large a scale that a deep and comprehensive knowledge of engineering science is necessary to make its expression stable.

The Master-Artist is the heaven-gifted man who, having conceived his projects in ultimate beauty of form, color, texture, and ornament, can build them structurally and economically perfect. It is seldom that any mind combines all of these attributes. It is more seldom that to-day's practice requires them in any one man. To-day, one man "designs"; another "frames."

It is the recognition of these two almost independent phases of architecture that has caused the University of Notre Dame to detach the Program in Architecture from the College of Engineering and to create the new College of Architecture.

The Faculty of the College now offers three undergraduate programs and two graduate programs to men able to furnish the entrance requirements. The program in design requires four years for completion and is offered to students wishing to specialize in design; the degree of Bachelor of Science in Architecture is the same length and is offered to men wishing to specialize in construction; the degree is Bachelor of Science in Architectural Engineering. Graduate years are offered in both programs, and upon completion, Master's degrees are conferred. A Short Program covering two years is offered to students finding it impossible or inexpedient to devote to school work the time required for completing the programs leading to degrees. Upon completion of the Short Program a Certificate of Proficiency is given.

The general scheme of the courses provides for work in the drafting-room continuously for four or five hours. In the Senior Year and in the Short Program the class-room requirements are less and the time to be spent in the drafting-room correspondingly lengthened.

Students matriculating for the Short Program or either of the complete programs must be at least eighteen years of age and must have completed the work preparatory to the programs either in the Preparatory School of the University or in an accredited school; or, entrance may be by examination at the University on the first two days of the Fall Term.

Students may not matriculate with more than one condition, and any condition interfering with the routine of the courses must be worked off privately.

For students matriculating with advanced standing there must be a corresponding increase in the age-limit.

Students taking the work of either of the graduate years must have received their Bachelor degree in Architecture, or in Architectural Engineering from Notre Dame or another School of Architecture of equal standing. The University will confer the Master's degree on her own graduate students not in residence at the end of one year if that time is spent in an *atelier* of the first order or in travel abroad following an approved program of study and investigation; or at the end of not less than two years if that time is spent in practice and the University's requirements are complied with.

EQUIPMENT

The equipment of the College of Architecture, from a small beginning, is rapidly becoming more and more complete. There are a number of signed drawings—some from the *Ecole de Beaux-Arts*, others from arch-

itects of national reputation; a large elaborate model complete in all its details of the New Cook County Court House in Chicago; photographs, engravings, plaster models, reference books and manufacturers' catalogues and samples. The collection, however, needs to be increased faster than the resources of the University will permit. Philanthropic friends of Notre Dame can not give money, or its equivalent, for a better purpose. The endowment of a Traveling Fellowship, preferably for the study of European Ecclesiastical Architecture, will be a benefaction of the utmost value. One thousand dollars will provide for one man for one year.

ENTRANCE SUBJECTS

ENGLISH. Part of the examination time is given for answering questions upon the text-books and required readings in the preparatory courses in English; the remainder for writing an essay.

ALGEBRA. Fundamental operations, simple equations, involution and evolution, radicals, radical equations and quadratic equations, including everything up to logarithms, as given in *Wentworth's College Algebra*, or of an equivalent in the larger treatises by other authors.

GEOMETRY. Plane and Solid.

TRIGONOMETRY. Plane and Spherical.

HISTORY. A general knowledge of the outlines of Ancient, Medieval and Modern History.

GEOGRAPHY, Physical, as much as is contained in the ordinary text-books.

PHYSIOLOGY. *Martin's Human Body*, or an equivalent.

BOTANY, - ZOOLOGY. Elementary.

CHEMISTRY. Elements of inorganic chemistry, as given in high schools of good standing. Laboratory work is required.

PHYSICS. Elementary. The preparation on this subject should include a course of lectures illustrated by experiments, and recitations from a text book similar to *Carhart and Chute's* or *Gage's*. Laboratory work is required.

CIVICS. Elementary.

FRENCH. A three years' course in French is required. Ability to translate French into English, and easy English sentences into French. Or,

GERMAN. A three years' course in German is required. Ability to translate German into English, and easy English sentences into German.

DRAWING. A knowledge of the use of drawing instruments, of projection drawing and elementary freehand.

Subjects required for Freshman standing:

English.....	4	History	2
Mathematics.....	3½	French or German.....	3
Science	2	Drawing.....	½
(Chemistry and Physics)		Elective.....	1

THE PROGRAM IN DESIGN

DEGREES: Bachelor of Science in Architecture.

Master of Science in Architecture.

It has been the aim of the College in offering this program so to arrange it that the student pursuing it will have upon completion a liberal education, a practical working knowledge of Construction, and a systematic and thorough training in Architectural Design and Composition. It may be undertaken

by students whose artistic intuition and temperament fit them especially for the æsthetic side of a noble profession.

The course is built up around the work in the drafting-room where half of the student's time is spent. The work in Design, beginning in the Freshman year with the intelligent study of the orders and simple problems involving their combination and use, and continued in the three following years by means of minor and major problems involving the planning of all classes of building from the simplest to the most monumental, is supplemented and rounded out by exercises in the various methods and media of rendering and by a thorough course in freehand and modeling.

The materials and methods of all trades and professions engaged in building operations are systematically studied in the Construction classes throughout the four years of the program. The writing of specifications for each branch in labor is studied synchronously. Practical work in the various trades is given so that the student may know good work and thus be able to superintend construction intelligently. The practical lessons are supplemented by trips to the important building operations and industries in the neighborhood of the University.

The standard hand-books and mill-books are used as supplementary text-books.

Graphic methods of determining stresses in beams, girders and trusses of all forms are studied and numerous practical problems solved.

Working drawings and detail of construction are made under office conditions.

Broadly speaking, it is the purpose of the College in outlining the construction courses to equip the

student to solve by *office methods* any problem he may meet in ordinary practice, it being taken for granted that graver problems requiring a deep knowledge of the higher mathematics may well be left to the architectural engineer.

In the last year of the program a series of lectures are given on estimates, contracts, law, business relations and professional ethics and practice. Architects of high professional standing will give a number of lectures in this course.

A history of architecture and of the allied arts is studied in a course covering four years. The method is a combination of lectures, recitations and research.

Courses either in mathematics or in English (with Electives as noted below) covering four years complete the curriculum.

In the Graduate Year advanced work in criticism and research is done and larger and more complicated problems are given in design.

ENGINEERING PROGRAM

DEGREES: Bachelor of Science in Architectural Engineering
Master of Science in Architectural Engineering.

The science of engineering has long since outgrown the practical limit of one man's abilities. To be thorough, the engineer must specialize. One of his specializations is in Architecture. His services are needed to frame important buildings, to design their foundations and to protect adjoining property while they are in erection. The modern idea of education is to progress in a course parallel to the world's needs. The College offers the Program in Architectural Engineer-

ing because there is need of the service of the men who can complete it.

Students desiring to become Architectural Engineers should have a bent for mathematics and for painstaking, exact draughting.

The program of studies differs from that of the Program in Design chiefly in the following particulars: Courses in pure and applied mathematics are substituted for the courses in English, economics and philosophy; the more important construction courses go deeper into theory; freehand work ends with the first year; the study of Historic Ornament and the Histories of the "Allied Arts" is omitted; and a relatively greater amount of time, increasing each year, is spent in structural design.

The Graduate year is spent entirely in the solving of problems of the first order in architectural engineering.

THE SHORT PROGRAM

Certificate of Proficiency.

The scheme of studies for the Short Program comprises most of the work of the complete program that is essentially architectural. A glance at the Program will show that there is relatively less class-room work and correspondingly more in Design each year than in either of the complete programs.

Ordinarily the same entrance subjects are demanded for the Short Program as for the Programs in Design and Engineering. A student may be allowed to take up work in the Short Program who is sufficiently mature in years and has had enough practical experience to warrant his following the work with profit.

EXPLANATION OF "HOURS"

A class hour means one hour of recitation or lecture and one to two hours of preparation. A freehand or design hour means two actual hours in the drafting-room.

It is the intention to have the students work steadily for four hours in the drafting-room.

PROGRAM IN DESIGN

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
English	3	152	I	English	3	152	I
El. of Arch.	5	121	I	El. of Arch.	5	121	I
Construction	4	118	I	Construction	4	118	I
History	4	158	II	History	4	158	II
Drawing	2	142	Ic	Drawing	2	142	Id
Des. Geom. Shades and Shadows	2	144	III	Perspective	2	144	III

SECOND YEAR

English	3	152	II	English	3	152	II
Design	8	121	II	Design	8	121	II
Construction	3	118	II	Construction	3	118	II
Hist. of Arch.	2	116	I	Hist. of Arch.	2	116	I
Drawing	2	142	IIa	Drawing	2	142	IIa
Graphics	2	139	XV	Graphics	2	139	XV
The'y of Des.	1	122	VIIa	The'y of Des.	1	122	VIIb

THIRD YEAR

Elective	4			Elective	4		
Design	8	121	III	Design	8	121	III
Construction	1	119	III	Construction	1	119	III
Hist. of Arch.	2	116	II	Hist. of Arch.	2	116	II
History of Ornament	2	117	III	History of Sculpture	2	117	IV
Drawing	2	142	IIb	Drawing	2	142	IIb
Heat and Vent.	1	119	V	Sanitation	1	120	VI

FOURTH YEAR

Elective	4			Elective	4		
History of Painting	2	117	V	Bus. Ethics	2	120	I
Pen and Ink	1	146	VIII	History of Painting	2	117	V
Water Color	1	146	XI	Modeling	2	145	V
Design	10	121	IV	Design	10	121	IV
				Thesis			

At the beginning of the First Year the student matriculating for the Program in Design may, with the consent of the Faculty, elect a Major in Mathematics instead of the Major in English. The Mathematics courses for the four years will be as follows; Algebra, I; Analytic Geometry, II; Calculus, III, IV, V; Physics, II, III; Analytic Mechanics, VIII; Mechanics of Materials, X.

At the beginning of his Third Year, the student following the regular Program in Design may, if his proficiency in English warrants it, elect to follow during the Third and Fourth Years one of the following courses: English, Philosophy, Political Science, History, French or German. He may not, however, elect a course in the same language that he offered for credit at matriculation. If the above election is denied the student, he must continue his work in English for one or two years more as may be decided by the Faculty.

PROGRAM IN ARCHITECTURAL ENGINEERING

FIRST YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	163	I	Anal. Geom.	5	163	II
Des. Geom.	3	144	I	Des. Geom.	3	144	I
Construction	4	118	I	Construction	4	118	I
Shades and Shadows	1	145	III	Perspective	1	145	III
Drawing	1	144	I	Drawing	1	144	II
Drawing	1	142	Ic	Drawing	1	142	Id
El. of Arch.	8	121	I	El. of Arch	8	121	I

SECOND YEAR

Calculus	5	163	III	Calculus	5	164	IV V
Physics	5	181	II III	Physics	5	181	II III
Construction	4	118	II III	Construction	4	118	II III
Design	8	121	II	Design	8	121	II
Drawing	2	142	IIa	Drawing	2	142	IIa
Theory of Design	1	121	VIIa				

THIRD YEAR

Anal. Mechan.	5	135	VIII	Anal. Mechan'	2	135	VIII
Sanitary Eng.	2	138	XIII	Mechanics of			
Electricity	1	149	VII	Materials	3	136	X
Heating and Ventilating	1	119	V	Sanitary Eng.	2	138	XIII
Hist. of Arch.	2	116	I	Surveying	3	133	II III
Struc. Design	8	121	V	Hist. of Arch.	2	116	I
				Struc. Design	8	122	V

FOURTH YEAR

Arch. Eng.	2	119	IV	Arch. Eng.	3	119	IV
Gridges and Roofs	5	139	XIV	Graphics	5	139	XV
Stereotomy	3	135	VI	History of			
Hist. of Arch.	2	116	II	Arch.	2	116	II
Struc. Design	8	122	VI	Bus. Ethics	2	120	I
				Struc. Design	8	122	VI
				Thesis			

SHORT PROGRAM

FIRST YEAR

SUBJECTS: FIRST TERM.	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P ^g e	Course			P ^g e	Course
Hist. of Arch.	2	116	I	Hist. of Arch.	2	116	I
Construction	4	118	I	Construction	4	118	I
Des. Geom.	}	144	III	Perspective	1	144	III
Shades and Shadows				Drawing	1	142	Id
Drawing	1	142	Ic	Pen and Ink	1	146	XII
El. of Arch.	12	121	I	El. of Arch.	4	121	IV
				Design	8	121	II
				The'y of Des.	1	122	VII

SECOND YEAR

Hist. of Arch.	2	116	II	Hist. of Arch.	2	116	II
Construction	4	118	II III	Construction	4	119	III
Graphics	2	139	XV	Graphics	2	139	XV
Heat and Ventilation	1	119	V	Sanitation	2	120	VI
Electricity	1	149	VII	Bus. Ethics	2	120	I
Water Color	1	146	XI	Drawing	4	142	IIa
Drawing	4	142	IIa	Modelling	2	143	V
Design	8	121	III	Design	8	121	III

THE COLLEGE OF LAW

For several years a systematic movement has been in progress, under the auspices of the bench and bar of the country to elevate the standing and promote the efficiency of the legal profession, and make it as learned in fact as it is in name. The most essential preliminary step to this end, as lawyers generally agree, is to prescribe requirements and examinations more comprehensive and rigorous as a test of qualifications for admission to the bar. Under the influence largely of the American Bar Association, the period now commonly prescribed for the study of law in a college is three years.

A period of three years' study is prescribed for undergraduates in the College of Law of the University of Notre Dame. The courses lead, when satisfactorily completed, to the degree of Bachelor of Laws. The Graduate program comprises an additional or fourth year of residual study, and leads to the degree of Master of Laws.

The degree of Doctor of Law (J. D.) or Doctor of Civil Law (D. C. L.) presupposes the degree of Bachelor of Laws and a Bachelor's degree in Arts or Science.

On account of the peculiarly favorable location of the University for diligent and persevering work, it is possible for industrious students to do at least a fourth more a year than is elsewhere attempted.

The undergraduate law students are divided into three classes, corresponding to each year of the program leading to the degree of Bachelor of Laws. The Graduate course is for students who have received that degree and aim at attaining, by further study and practical work, to a higher grade of proficiency. A full year of study in each class is obligatory. More-

over the student must pass a satisfactory general examination at the close of each scholastic year. Graduates entitled to vote are admitted to the bar on motion of the Supreme Court of Indiana.

Candidates for degrees in the College of Law are admitted to the first year on presentation of a certificate of graduation from a four year High School or Preparatory School of recognized standing, or by examination in subjects mentioned on page 21. It is strongly recommended that students complete the work prescribed for a Bachelor's degree in one of the Programs of the College of Arts and Letters, before taking up the study of Law. It is impossible for the student to give more than two years to work of this nature, even that much is highly desirable.

Students from other reputable law schools are received at any time and allowed due credit for the work previously done. They must, however, be in residence for at least one year in order to be entitled to degrees.

Lawyers who have been engaged in the practice of the profession or have only been admitted to the bar, as the case may be, are admitted to the Senior class and entitled to the degree appropriate to their work and standing at graduation in the following June.

SPECIAL STUDENTS

Students who do not intend to become candidates for the degree of Bachelor of Laws, but wish simply to add to their educational acquirements a knowledge of the fundamental principles of law, may at any time in the year have their names enrolled on the list of special students. No extra expense is thereby incurred. Yet they must be of sufficiently advanced age and education to justify the belief that they can understand and appreciate instruction in the law. No

particular academic entry requirement is prescribed for them, aside from securing the consent of the Director of Studies and being of sufficient age and capacity to understand and profit by instruction in the law. The number of such students is likely to increase steadily for year by year it is becoming more manifest that an education is not complete without a knowledge of at least the elementary legal principles. Many a person has been forced to do exactly the contrary of what he intended through his failure to understand the essential elements of a contract. Many a one has been compelled to pay heavy damages for personal injuries caused by negligence, or failure to perform a duty, or improper performance of it, where no liability would exist if the law of torts had been known and observed.

METHODS OF INSTRUCTION

The study of cases is usually begun in September and continues long enough to enable students to understand, analyze and criticise the decision assigned to them for study and recitation. Lectures and explanations supplement this work. After thus familiarizing themselves with cases, they are expected to read the authorities cited daily in class, whether in the text-books, lectures or quizzes, and must report on their readings. In moot court work, likewise, they are prepared for actual practice by making a careful study not only of the cases in the reports, but also of those cited in text-books and digests.

In examinations for admission to the bar the courts of some States require applicants to furnish lists of the text-books they studied, and such as have merely attended lectures or studied cases, instead of reading text-books, encounter danger of being declared ineligible

to appear for examination. As many law students come from States in which this test is applied, the use of text-books is deemed necessary. The books used by students become peculiarly serviceable in their subsequent practice. They may be purchased in the Students' Office at the University at the lowest retail prices. The cost may be estimated at \$20 or \$25 a year.

The lecture or dictation system alone is regarded at Notre Dame as impracticable but, in combination with text-book work, case readings and daily examinations, its great value and utility can not be overestimated. Each subject is fully covered by lectures, text-book work, weekly quiz, monthly theses, bi-monthly examinations, the reading of pertinent cases and formal trials in the moot court and other courts of the college. Students have also the advantage of attending important cases in the higher courts of South Bend.

The course of instruction is comprehensive, thorough and practical. The earnest and industrious student can accomplish twice as much in a given time at Notre Dame as he can in an office or at home. With comparative immunity from distractions and temptations of city life, he can give his entire time to study and necessary recreation. In short, he can here study a greater number of hours and do more class work day by day than probably anywhere else in the country. Students have from three to four recitations daily, based upon the text-books, the books of selected cases, the questions answered in writing or the subjects dealt with in the lectures. From one to two hours additional must be devoted daily to office and library work, while two hours weekly are required for moot court practice and exercises of the law debating society. While this society and the moot court offer exceptional opportunity

and strong incentive to acquire readiness in debate, fluency in speech and force in forensic oratory, yet much benefit may be derived from attending the regular classes in elocution and oratory in the College of Arts and Letters.

When a subject is regularly begun in the Law Program it is studied and kept before the class, with recitations day by day at the same hour, until finished. It is believed that in this way the mind follows it more closely and that it is better understood than it would be if frequently interrupted by the intervention of other and dissimilar subjects.

THE MOOT COURT

All third year students are required to attend and participate in the exercises of the moot court. The court is fully organized, having a judge, clerk, state's attorney, sheriff, coroner and reporter. Pleadings are filed in the clerk's office, served and returned by the sheriff, brought to an issue with due formality by the attorneys, and the trial proceeds under the rules of evidence before a member of the Faculty acting as judge.

In addition to the moot court, which corresponds to the ordinary circuit or trial court, there is a fully-equipped court of equity, with its chancellor, clerk, master-in-chancery, bailiff and reporter.

There is likewise a justice's court. This comprises the justice of the peace, clerk and constable.

The Federal judicial system is also represented. The United States District Court, for example, has its district judge, clerk, district attorney, marshal and reporter.

The course of procedure in these courts follows as closely as practicable the actual procedure in the courts they represent. Practice is combined with theory in their

work. The statement of facts in the cases tried is furnished by the Faculty. Students acquire in this way a knowledge of the customary procedure in the regular courts.

THE LAW LIBRARY

There are undoubtedly in the country several law school libraries considerably larger than the library at Notre Dame; but it may well be questioned whether any of them shows any more care in the choice of books, or is better adapted for the use of students. All the latest reports of State and Federal courts are on its shelves, and no difficulty is experienced at any time in finding the cases needed for reference, thesis writing and moot court work. A great library with a crowdingly large attendance of students—too many to be personally known by or to have personal attention from the Faculty—may often be less available for use or accessible than a comparatively small one. It happens sometimes in such cases that twenty or more students are found vainly scrambling at the same time to secure possession of a particular report or text-book. Such experience, fortunately, does not fall to the lot of the young men studying at Notre Dame. Not only all the latest reports, but likewise the leading text-books, are to be found on the library shelves.

The books may be read in the library or used in Moot court trials, but must not be carried to private rooms. This rule is rigidly enforced by the librarian. It is intended for the advantage and to facilitate the work of the students in common, for all have a right to feel reasonably certain that when a book is needed it can be found in the library.

The books on the shelves of the law library number 4,000, but so carefully have they been selected that they may be said to surpass in practical utility many

libraries twice as large. The library adjoins the law lecture room. It is practically open all day and until 9:30 o'clock at night. The light and ventilation are excellent, and students find it a very wholesome and comfortable place in which to study.

In addition to the law library, the general library of the University is open, likewise, at all reasonable hours to law students. The library privileges are on a generous scale, and students are not specially charged for making proper use of the books, but if a book is lost or injured through negligence the cost of the book is charged to the borrower.

THE LAW DEBATING SOCIETY

holds its meetings weekly. First year students of the College are members of it. They are required, each in his turn, to participate in its debates and other exercises. The debates commonly deal with questions germane to the law, but subjects of history, political economy, and the like, are also discussed; in addition, a thorough drill in parliamentary law proceedings is given. An excellent opportunity is afforded at the meeting of the society to develop skill, power and fluency in public speaking. One of the professors usually presides and aids the members with his counsel and suggestions.

THE COURSES IN LAW

FIRST YEAR

Elements of Law. Fourteen weeks.
 Real Property. Eighteen weeks.
 Personal Property. Four weeks.
 Criminal Law. Ten weeks.
 Torts. Ten weeks.
 Contracts. Sixteen weeks.
 Persons and Domestic Relations. Ten weeks.
 Sales. Eight weeks.

Agency. Ten weeks.
 Partnership. Eight weeks.
 English I. Thirty-six weeks, three times a week.
 Elocution, weekly.

SECOND YEAR

Criminal Procedure. Ten weeks.
 Damages. Twelve weeks.
 Federal Procedure and Bankruptcy. Fourteen weeks.
 Suretyship and Guaranty. Fourteen weeks.
 Bills and Notes. Sixteen weeks.
 Interpretation of Laws. Six weeks.
 Insurance. Twelve weeks.
 Bailments and Carriers. Ten weeks.
 Wills, Executors and Administrators. Fourteen weeks.
 Medical Jurisprudence. Lectures.
 Parliamentary Law and Debating, weekly.
 Logic. Eighteen weeks, four hours a week.
 Ethics. Eighteen weeks, four hours a week.

THIRD YEAR

Evidence, Civil and Criminal. Twelve weeks.
 Constitutional Law. Twelve weeks.
 Equity Jurisprudence. Twelve weeks.
 Corporations, Private. Sixteen weeks.
 Corporations, Public. Ten weeks.
 International Law. Ten weeks.
 Common Law Pleadings. Twelve weeks.
 Equity Pleadings. Twelve weeks.
 Code Pleadings. Twelve weeks.
 Moot Court. Practice weekly.

GRADUATE COURSES cover the entire field by way of review, together with Moot Court practice, office work, etc. The optional studies include Roman law, Admiralty, Mining and Water Rights, Copyright, Patents, Trademarks, State and Federal Statutes, etc.

SCHEDULE OF CLASSES

FIRST YEAR

SUBJECTS	WEEKS	PERIODS A WEEK
Elements of Law, Real and Personal Property.....	...36...	...5...
Criminal Law, Torts, Contracts.....	...36...	...5...
Persons, Agency, Sales, Partnership.....	...36...	...5...
English, I.....	...36...	...3...
Elocution III. IV.....	...36...	...1...
SECOND YEAR		
SUBJECTS		
Criminal Procedure, Federal Procedure and Bankruptcy, Damages.....	...36...	...5...
Bills and Notes, Suretyship and Guaranty, Interpretation of Laws.....	...36...	...5...
Insurance, Bailments and Carriers, Wills, Executors and Administrators.....	...36...	...5...
Logic, Ethics.....	...36...	...4...
Medical Jurisprudence, Lectures.....4...
Parliamentary Law and Debating.....	...36...	...1...
THIRD YEAR		
SUBJECTS		
Corporations, Public and Private, International Law.....	...36...	...5...
Evidence, Constitutional Law, Equity Jurisprudence.....	...36...	...5...
Common Law Pleadings, Equity Pleadings, Code Pleadings.....	...36...	...5...
Moot Court.....	...36...	...1...

COURSES OF INSTRUCTION

(In the description of the courses of instruction an hour means forty-five to sixty minutes in the recitation or lecture room and one hundred and twenty minutes in the laboratory, the drawing room or the shop. A term means a half year, or eighteen weeks.)

ANATOMY

I.

HUMAN HISTOLOGY. Laboratory work and demonstrations. Preparations of the tissues and organs of the human body given to each student, and their structure demonstrated. This course is taught in connection with Course I. under Human Physiology.

II.

HUMAN HISTOLOGY. Lectures, recitations and laboratory work. The work covers a thorough course in Normal Histology, with the methods of hardening, staining, embedding, section cutting, and mounting of tissues. Careful work on the nervous system—brain and spinal cord, termination of nerve fibers, etc. Drawings made from each preparation. Text-book, *Piersol*.

[Two laboratory hours a week for two terms.]

III.

HUMAN ANATOMY. Lectures and Recitations. Osteology and the descriptive anatomy of the muscular, vascular and nervous systems and of the organs of special sense. The anatomy of the viscera. Text-book, *Gray*.

[Four hours a week for two terms.]

ARCHITECTURE

I. AND II.

HISTORY OF ARCHITECTURE. This course includes a study of the history, manners, customs, politics and religion as well as of the Architecture of Egypt, Assyria, Greece and Rome. It takes up the rise and development of Christianity and the Christian types—Basil-

ican, Byzantine, Romanesque, Gothic and Renaissance in all their phases. Some attention is paid to Oriental styles. A comprehensive review is made of American work. In seminar the course is completed by a study and discussion of the various phases of "The New Art," both abroad and in the United States.

Instruction is by text-book, lectures, readings and research.

[Two hours a week for four terms.]

III.

HISTORIC ORNAMENT. A study of the origin and evolution of all styles of ornament, and of its application to architectural forms.

Instruction by text-book, lectures, readings, and drawings in various media.

Text-book, *Glazier*.

[Two hours a week for one term.]

IV.

HISTORY OF SCULPTURE. A brief historical review of ancient and modern sculpture.

Instruction by text-book, conference and research.

Text-book, *Marquand and Frothingham*.

[Two hours a week for one term.]

V.

HISTORY OF PAINTING. A brief historical and critical review of Painting.

Instruction by text-book, conference and research.

[Two hours a week for two terms.]

CONSTRUCTION

I.

In this course the student obtains a thorough knowledge of the materials and methods of masonry, carpentry, roofing, metal-working, painting. Each trade is considered separately, and at conclusion an exhaustive study of specification writing and methods of estimating for it is made. Detail drawings of constructive methods are made exactly as in an architect's office.

In the spring term of his last three years each student is required to stake out on the campus one of his projects, and to furnish all levels required by the builder in order to acquire thoroughness in the use of the architect's level and compass.

The University constantly furnishes employment to a large force of trained mechanics who will give personal lessons to the students in all branches of these trades. Inspection visits are made regularly as a supplementary exercise in superintendence, to important building operations in the neighborhood.

Instruction by text-book and lectures.

Fifteen points must be made in inspections and drawings.

Text-book, *Kidder's Building Construction, Vols. I, II; Kidder's Handbook. Supplementary, Sweet's Index.*

[Four hours a week for two terms.]

II.

A thorough study of foundation work—caissons, piles, grillage, spread and stepped footings; fire proofing of all forms; the design and construction of steel framing.

Working drawings for one year of the student's projects are made. Especial care and accuracy are de-

manded in the preparation of the framing plans and details.

Instruction is by text-books and lectures. Eight points must be made in inspections and drawings.

Text-books, *Kidder, Vol. I; Frietag; Supplementary, Sweet's Index, Carnegie and Bethlehem "Millbooks."*

[Three hours a week for two terms.]

III.

A study of Reinforced Concrete; Elevators; Power plants for buildings.

Instruction by text-book and lectures.

Five points must be made in inspection and drawings.

Text-books, *Watson; Supplementary, Sweet's Index, Concrete Handbooks.*

[One hour a week for two terms.]

IV.

ARCHITECTURAL ENGINEERING. A course in which the student is taught to solve graphically and analytically more complicated problems in structural design and applied mechanics. Shoring, underpinning, retaining walls, jointed trusses, arches, vaults and domes are the more important topics.

Instruction by text-book. Twelve points must be made in instructions and drawings.

Text-books, *Kidder, Vols. I, III; Whitmann.*

[Two hours a week for one term, three hours a week for one term.]

V.

HEATING AND VENTILATION. This course is a study of the theory and practice of heating and ventilating public buildings and dwelling houses. The different systems of heating are carefully examined and studied. The radiation of heat from furnaces, the different

systems of piping, condition of air as to moisture, amount of air required, causes and best means adopted to secure pure air; the necessity of good ventilation and the latest approved methods of securing this are some of the topics considered in this study.

Instruction by text-book and lectures.

Text-book, *Carpenter*.

[One hour a week for one term.]

VI.

SANITATION. The following are the topics covered in this course: The carrying away of surface water and wastes from the building; pipes and fittings; one and two-pipe roughing-in systems; traps; domestic waste supplies; pumping engines; heating of water for domestic purposes; plumbing fixtures.

Instruction is by text-book and lectures.

Text-book, *Cosgrove*.

[One hour a week for one term.]

BUSINESS ETHICS

I.

In this course are given descriptions of a system of book-keeping suited to the needs of an architect's business, a system of building accounts, filing systems for catalogue and prints, a card index system for prints and general information; of forms for agreements with bonds, and for certificates; the laws affecting clients, contractors and architects; and the rules of professional ethics in private practice, competitions and municipal affairs.

Instruction is by text-book and lectures.

Text-book, *Wait*.

[Two hours a week for one term.]

DESIGN

I.

ELEMENTS OF ARCHITECTURE. This is a course of drawing. Thirty-two plates of standard size (or their equivalent) will be made during the year. They consist of measured drawings of the Roman and Greek orders, of the various details associated with them and of simple problems involving their use; of lettering; of exercises in wash and color; and of studies in shades and shadows and perspective.

Each plate will be examined by the Professor in charge, and may be marked "Pass," "Mention," or "Highest Mention," counting $\frac{1}{2}$, $\frac{3}{4}$ or 1, point, respectively. All plates must be drawn and at least fifteen points registered.

Instruction is by text-book.

Text-books, *Ware von Mauch*, *McGoodwin*.

[Eight hours a week for two terms.]

II, III, AND IV.

These courses are the most important on the program. In the solving of the problems the student makes use of every item of information that he has acquired in all his other class-work, for the aim of the instruction in design is, primarily, practicability. The planning is straightforward, logical and direct; the design is powerful, simple, and expressive. The method is criticism. The means are major and minor problems of varying degrees of difficulty varying from a masonry gate-post to the most monumental projects. These problems are stated in programs that are made definite and practical and as like actual conditions as possible.

Second year men are required to execute eight minor and eight major problems; third year men, eight minor and six major problems; and fourth year men, four minor and three major problems and the thesis.

These designs are criticised by the Professor in charge, or by some able architect especially invited. They may be marked "Pass," "Mention," or "Highest Mention," counting $\frac{1}{2}$, $\frac{3}{4}$ or 1 point respectively for minor problems, and 2, 3, or 4 points for major problems.

Fifteen points must be registered in second year design, as many in third year design, and eight in fourth year design before thesis work is started.

[Eight, eight and ten hours a week, respectively, for three years.]

V, VI.

STRUCTURAL DESIGN. These courses have the same relative importance as the courses in design. The analogy goes further, the work is given as major and minor problems of varying degrees of difficulty and is judged and marked in the same manner. The scope of the problems will vary from the making of an ordinary footing plan to the framing of the structural steel of a large dome.

The amount of work and the points required to be registered is the same for the same year under *Design II, III, IV*.

[Eight hours a week for three years.]

VII.

(a) THEORY OF DESIGN. A thorough study of the principles of planning and proportion supplemented by study of the perfection and faults of the world's famous buildings.

Instruction by text-book and lectures.

Text-book, *Robinson*.

[One hour a week for one term.]

(b) CHURCH DESIGN. This course is conducted by mean of lectures and research. It includes the arrangements of sanctuaries, sacristies and baptisteries as affected by liturgical needs. The subject of church furniture and accessories is also discussed.

[One hour a week for one term.]

ASTRONOMY

ASTRONOMY. Practical. This course is designed to meet the requirements of Civil Engineering students and to give them the training and information necessary for intelligently executing certain departments of work to which they may be assigned in the course of their professional career. The course comprises a study of astronomical instruments as well as instruments of more precision than those used in ordinary surveying. The adjustments and use of these instruments are considered, and instruction is given in methods of observation and computation; problems in finding right ascensions and declination; different methods for finding altitude, longitude and time are studied in detail, and the methods for finding right ascensions and declination; different methods for finding latitude, longitude and time are studied in detail, and the methods of making the observation and their adjustments, and discussion of errors. Conversion of solar time into sidereal, and sidereal time into solar. In connection with this subject is given a more complete study of many of the topics considered in elementary astronomy, as here they are treated mathematically; as for example,

methods for finding parallax, computation of eclipses, altitudes and correction for refraction. The subjects of procession, nutation, annual aberration, proper motion of stars, etc., are studied. Text-books, *Young, Greene*.

[Three hours a week for one term.]

BACTERIOLOGY

LECTURES AND LABORATORY WORK. Lectures on the form, structure, reproduction and classification of bacteria. The relations of bacteria to disease, etc. The principles of sterilization, thermal and chemical, are pointed out. The early part of the laboratory work is occupied in the preparation of the various culture media and in studying pure cultures of certain non-pathogenic bacteria in these media. Observations on the microscopic characteristics of bacteria and special attention to the microscopic technique in bacteriological work. Later on in the course some time is devoted to practice in isolation and identification of pathogenic germs by the various staining processes. Inoculation of animals. Bacteriological investigation of water, air and soil. Text-book, *Abbott's Principles of Bacteriology*.

[Five hours a week for fourteen weeks.]

BOTANY

I.

BOTANY. Lectures and recitations on the morphology of the root, stem, leaf, flower, fruit and seed; the development of the embryo and the processes of pollination and fertilization; the study of the vegetable cell, of its products, of cell formation, of plant tissues and the various physiological phenomena; the structure, growth, reproduction and general classification of the algae, fungi, lichens, mosses, ferns, and the higher plants. Text-book, *Bastin's College Botany*, Barnes & Coulter.

[Four hours a week for two terms.]

II.

BOTANICAL LABORATORY. Supplementary to Course I. Special microscopical study of thallophyta, bryophyta, pteridophyta and spermatophyta referred to in Course I. Drawings must be made of all plants examined. Plants under these headings are collected and put before the student that he may become familiar with their morphology, structure and classification. The course is to accompany or to be preceded by Course I. Provision is also made in this course for students in pharmacy to take a special laboratory course in pharmaceutical botany. Study of the determination and classification of the simpler plants. The analysis of the phanerogams occupies the time during the spring months and the student is made familiar with the habitat and characteristics of the local flora. Text-book for classification of plants, *Kellerman's Spring Flora*.

[One laboratory hour a week for two terms.]

III.

ADVANCED BOTANY. Lectures, recitations, demonstrations. The work of this course is essentially the same

as that laid out in *Strasburger's* or *Vine's* text-book of Botany. Special study is made of the physiology, ontogeny, phylogeny, ecology and classification of plants. Text-book, *Strasburger*.

[Three hours a week for two terms.]

IV.

LABORATORY FOR ADVANCED BOTANY. Supplementary to Course III., and either following or accompanying it:

(a) PLANT HISTOLOGY AND PHYSIOLOGY. Half of the time allotted for laboratory work is devoted to plant histology and physiology. The student is required to study practically the method of killing, fixing, embedding, sectioning, staining, mounting and drawing of plant tissues. Text-book, *Chamberlain*.

(b) PLANT CLASSIFICATION ADVANCED. The other half of the laboratory work is devoted to the determination and classification of the more difficult plants, the compositae, grasses, mosses, myxomycetes, etc. Herbarium study is required, as well as preparing and collecting plants for preservation. During spring and autumn frequent excursions into the neighboring fields and woods are made for the purpose of studying and collecting for preservation the local aquatic and land flora. Text-book, *Britton's or Gray's Manual*.

[One and one-half hours a week for two terms.]

V.

SYSTEMATIC BOTANY. Principally laboratory and herbarium work in special groups of phanerogams and cryptogams. Study of nomenclature and classification of plants. This course is designed to meet the needs or inclinations of students specializing in botany. Library, reference books and seminar work.

GRADUATE WORK IN BOTANY. Original research in systematic botany. Plant history and cytology. Preparatory to the Master's or Doctor's Degree.

CHEMISTRY

I.

(a) GENERAL CHEMISTRY. A minor course dealing with the general principles of chemistry and embracing a study of only the commoner elements and their typical compounds. Text-book, *Maguire's Elements of Chemistry*.

[Three hours a week for two terms.]

(b) A LABORATORY COURSE covering in the laboratory the work of the Course (I. a.) and designed to accompany it. *Laboratory Manual, Maguire*.

[Two hours a week for two terms.]

II.

(a) ADVANCED INORGANIC CHEMISTRY. Lectures and recitations. A complete study of the elements and their most important compounds, following the classification based on Mendeléeff's Law, and including a discussion of the theories of the science. Text-book, *Alexander Smith's College Chemistry*.

[Two hours a week for two terms.]

(b) EXPERIMENTAL CHEMISTRY. A Laboratory course to accompany Course II., the work consisting of the preparation by the student of the elements and their more typical compounds, determination of molecular weights, verification of the fundamental laws of chemistry, etc. During the latter part of the course, there is taken up the study of the reactions involved in the separation and detection of the more common inorganic bases and acids, the analysis of salts, mixtures of salts,

and the complex substances, such as earths, ores, ashes, etc. Text-books, *Perkin* and *Thorpe*, supplemented with lectures.

[Two to three hours a week for two terms.]

III.

QUALITATIVE ANALYSIS. A course arranged for the students in Pharmacy, comprising a study of the commoner metals and acids, their reactions and separation. Text-book, *Perkin*.

[Four hours a week for one term.]

IV.

QUANTITATIVE ANALYSIS. Course suited to the needs of the students in Pharmacy, comprising the determination of substances, both gravimetrically and volumetrically. Text-books, *Appleton* and *Schimpf*.

[Four hours a week for one term.]

V.

QUANTITATIVE ANALYSIS. A laboratory study of the principles involved in the quantitative separation and estimation of substances, both gravimetrically and volumetrically. Complete analysis of a number of simple salts, like barium chloride, with partial analysis of many complex substances. Text-book, *Talbot*.

[Four hours a week for two terms.]

VI.

(a) ELEMENTARY ORGANIC CHEMISTRY. Lectures and recitations. A systematic study of the hydrocarbons and their derivatives, and the investigation of their properties. Special attention is given to the aliphatic and aromatic series. Text-book, *Remsen*.

[Five hours a week for one term.]

(b)* EXPERIMENTAL ORGANIC CHEMISTRY. A course fitted to accompany the preceding, involving the preparation by the student in the laboratory of the most important and typical organic compounds and the investigation of their properties. Text-book, *Gatterman's Manual*.

[Two hours a week for one term.]

VII.

(a) URINE ANALYSIS. A course of laboratory exercises in the methods employed in the detection and estimation of the constituents of urine, pathologic as well as normal. Text-book, *Holland*.

[Three hours a week for one term.]

(b) TOXICOLOGY. Symptoms and treatment of poisoning. A chemical and physical examination of the common poisons to familiarize the student with their properties. Attention is also given to their separation from food and animal tissue. Text-book, *Holland*.

[Three hours a week for one term.]

VIII.

TECHNICAL CHEMICAL ANALYSIS. Advanced courses intended for students specializing in chemistry. Special courses, at the option of the student, in

- I. GAS ANALYSIS.
- II. WATER ANALYSIS.
- IV. COMMERCIAL ORGANIC ANALYSIS.
- V. OILS AND FATS.
- VI. IRON ANALYSIS.

Text-books, *Hempel, Mason, Wiley and current journals*.

[Five to fifteen hours a week for two terms.]

IX.

(a) ADVANCED ORGANIC CHEMISTRY. An advanced course, intended for students specializing in chemistry. Lectures, recitations and discussions of special subjects

of organic chemistry, synthetic chemistry, isomerism, and stereochemistry. Text-books, *Cohen* and special reference works.

[Two hours a week for one term.]

(b) ADVANCED ORGANIC LABORATORY. The term is spent principally in the making of organic preparations by methods demanding special care, skill and accuracy in the student.

[Six to eight hours a week for two terms.]

(c) ADVANCED ORGANIC LABORATORY. This term is devoted to ultimate organic analysis, qualitative and quantitative; analysis of carbon, hydrogen, the halogens, sulphur and nitrogen in organic compounds by the various methods; also in the determination of molecular weights of organic compounds. Text-books, special notes and reference work.

[Eight hours a week for one term.]

X.

GENERAL PHARMACEUTICAL CHEMISTRY. In this course the chemical bases and their compounds are considered, with special reference to their importance in pharmacy and materia medica. Text-books, *Sadtler's and Trimble's Pharmaceutical Chemistry*.

XI.

(a) ELECTROCHEMISTRY. Lectures and recitations on the principles of electrochemistry and their application in the chemical industries, separation of metals, the preparation of chemical elements and electrosynthesis of compounds. Text-book, *Lüpke*.

[Two hours a week for one term.]

(b) ELECTROCHEMICAL LABORATORY. A laboratory course accompanying Course XI (a). Experiments demonstrating the laws and principles of electrochemistry, electrolysis, electrosynthesis and electro-metallurgy. Text-book, *Lüpke*.

[Two hours a week for one term.]

(c) ELECTROCHEMICAL ANALYSIS. A laboratory course for those who have completed (a) and (b). Quantitative determination and separation of metals and anions electrolytically using stationary and revolving electrodes, the mercury cathode and their combinations. Text-book, *Smith's Electro-Analysis*.

[Two hours a week for one term.]

XII.

HISTORY OF CHEMISTRY. The subject is divided into topics and epochs of special interest in the development of chemistry as a science. These are discussed at length, together with the biographies of the men who aided in their development. Lectures and recitations. Seminar and journal work for advanced students. Text-book. *Meyer*. Reference to chemical periodicals.

[Three hours a week for one term.]

XIII.

(a) PHYSICAL CHEMISTRY. Lectures and recitations. A mathematical exposition of chemical theory on the subject of gas density, solutions, chemical dynamics, the phase rule, thermochemistry, photo-chemistry, etc. Text-book, *Jones*.

[Three hours a week for one term.]

(b) EXPERIMENTAL PHYSICAL CHEMISTRY. Laboratory work to accompany Course XIII (a). Vapor density methods, calorimetric demonstrations, mole-

cular weight demonstrations by the freezing and boiling point methods, etc.

[One hour a week for one term.]

XIV.

INDUSTRIAL CHEMISTRY. Lectures, recitations and laboratory work. The consideration of chemical manufacture, fuels, etc., and the preparation in the laboratory of chemically pure substances, organic and inorganic. Special reference books and journals.

[Five hours a week for two terms.]

XV.

ADVANCED QUANTITATIVE. Mostly laboratory work in special methods for gravimetric and volumetric determinations of inorganic substances. Special reference work. [Five hours a week for one term.]

RESEARCH WORK. Special facilities are offered to graduate students desiring to do original research work in chemistry, preparatory to the Master's or Doctor's degree.

CHRISTIAN DOCTRINE

All Catholic students are obliged to attend the courses in Christian Doctrine.

FIRST YEAR

Introduction to Scripture. Reading of the Bible.

SECOND YEAR

MORAL AND DOGMA as found in *Wilmer's Handbook of the Christian Religion* or a similar work.

THIRD YEAR

APOLOGETICS. Religion. Pre-Christian Revelation. The Christian Revelation. The Catholic Church.

FOURTH YEAR.

CHURCH HISTORY. A brief survey of the general history of the Church. Special attention to more important periods.

CIVIL ENGINEERING

I.

DESCRIPTIVE GEOMETRY. In this course are considered problems on the point, right line, and plane; single curved, double curved, and warped surfaces; problems relating to tangent planes, to single curved, double curved and warped surfaces; intersection of surfaces; spherical projections; orthographic, stereographic, globular, cylindrical, and conic projections; construction of maps, shades and shadows; linear perspective; isometric projections; theory and plates. Numerous practical problems and exercises requiring the application of the principles of Descriptive Geometry, are added by the instructor. Text-book, *Church*.

[Three hours a week for two terms.]

II.

SURVEYING. This course comprises the whole theory of land surveying and leveling; the use and adjustment of the transit, compass, level, and plane table; methods of measuring; relocations of boundaries; supply omissions; obstacles to measurement; computations; field notes and plots; laying out land; parting off land; dividing up land: public lands survey. Text-book, *Breed and Hosmer*.

[Three hours a week for one term.]

III.

SURVEYING. Field practice and application of theory; adjustment and use of instruments in the field; solution of problems in the field, the theory of which is taught in the class room; practice in keeping field notes; computation and plots.

[One hour a week for one term.]

IV.

HIGHER SURVEYING. This course is a more complete treatment of the theory of Surveying than Course II, and can not be taken until the completion of that course. It treats of the adjustment, use, and care of all kinds of engineering instruments; problems pertaining to solar attachment; topographical surveying with the transit and stadia; mining surveying, mining claims; survey of mines with shafts and drifts; determining positions of ends of tunnels, and depths below surface; Hydrographic surveying which comprises a study of the methods of making soundings and locating the same; the use of bench-marks, gauges, and water levels; stream measurement, methods and instruments used. City surveying, including a study of re-surveys, topographic surveys, city plan, location of streets, width of grades, field notes, indexing and records. Text-book, *Johnson*.

[Five hours a week for twelve weeks.]

V.

SURVEYING. Exercises in the field in the adjustment and use of engineering instruments; stadia and plane table surveying in the fields, leveling; practice in hydrographic surveying.

[One hour a week for one term.]

VI.

GEODESY. This is an elementary course prescribed for Civil and Mining Engineering students and comprises a study of the instruments and methods of observation, base measurements and field work of the triangulation; method of least squares, elementary course; calculation of the triangulation, the theory of probable errors; geodetic latitudes, longitudes, and azimuths. This is followed by a brief discussion of the figure of the earth. Text-book, *Johnson*.

[Five hours a week for six weeks.]

VII.

RAILROAD SURVEYING. This course comprises all the theory pertaining to reconnoissance and preliminary surveying for a railroad; theory and maximum economy in grades and curves; location of curves by deflection angles and offsets; obstacles to location of curves; special problems in curves; theory of compound curves; turnouts and crossings; curving the rail on curves and elevation of outer rail; easing grades on curves; vertical curves; earthwork and prismoidal formula; theory of excavation and embankment; correction in excavation on curves; cross-section leveling; theory of the transition curve and practical applications. Text-book, *Crandall*.

[Five hours a week for one term.]

VIII.

RAILROAD SURVEYING. Exercise in the field; staking out and running tangents, simple, compound and transition curves; execution on the ground of many problems previously treated theoretically; survey for a short line of railroad, leveling, cross-section work, and setting slope stakes; making profiles and maps; calculating

the necessary excavations and embankments and cost of construction; culverts.

IX.

ANALYTIC MECHANICS. The aim of this course is to prepare students of engineering for the study of the courses of applied mechanics. The course comprises a study of the fundamental principles of statics, kinematics and kinetics. The subjects selected are studied with the object of thoroughly preparing the engineering student to pursue the technical and practical branches of their respective courses. Some of the topics considered in this course are: work, energy, conservation of energy; power, composition and resolution of forces, center of gravity, center of mass, moment of inertia, acceleration, dynamics of rigid bodies, laws of friction, etc.

[For Civil Engineering Students, five hours a week for first term. Two hours a week for second term.]

[For Students in Electrical, Mechanical, Chemical, and Mining Engineering, five hours a week for fourteen weeks.]

X.

MECHANICS OF MATERIALS. This course is intended to meet the requirements of engineering students, and to prepare them, by study of the action and effect of forces on beams and structures, to design economically and intelligently the parts entering into a complete structure. The course comprises a study of the elastic and ultimate strength and ultimate deformation of the materials of engineering, their properties and method of testing, and discussion of cases of simple stresses. The general theory of beams including cases of simple and cantilever beams, overhanging, fixed, and con-

tinuous beams, is thoroughly investigated. Columns are examined according to Euler's, Rankin's and other formulae, and results compared. Some of the other subjects considered in this course are torsion of shafts, the transmission of power by shafts, apparent combined stresses, such as flexure and compression, flexure and torsion, etc. Compound columns and beams, reinforced concrete beams, plate girders and other forms. Then is studied the subjects, resilience and work, impact and fatigue, true internal stresses, centrifugal tension and flexure, unsymmetric loads on beams, the course closing with a study of the mathematical theory of elasticity.

[For students of Civil Engineering, three hours a week
for two terms.]

[For students of Electrical, Mechanical, Mining and
Chemical Engineering, three hours a week
for twenty-two weeks.]

XI.

ROADS AND PAVEMENTS. This course is intended to familiarize the student with the practical details of laying out and constructing highways, the method of drainage, grading, and most suitable road covering, the improvement of streets in cities and materials used for paving and covering. The manner of preparing the street before paving is placed in position is fully considered and illustrated. The course includes a thorough discussion of the theory of pavements and a description of the various materials used, such as cobble and stone-block, asphalt, brick, wood and broken stone pavements. The method of preparing plans and specifications for the various conditions arising are considered and original plans are prepared by students. Attention is also given to the construction

of street-car tracks in paved streets. Text-book, *Baker*.

[Four hours a week for one term.]

XII.

ENGINEERING. This course is taken by students of Civil Engineering in the Senior year and teaches the best approved methods of constructing engineering works and the styles of structures suitable for different localities. The study is quite comprehensive, including the general theory of the arch and application of the voussoir arch; the theory of earth pressure, and the design of retaining walls; foundations suitable for structures of various classes in connection with which the student becomes acquainted, not only with the methods for ascertaining the bearing power of the foundation, but also the means for constructing deep foundations. The methods for tunnel construction, irrigating canals, river improvements, are included in the course and given by text-book and lectures. The part pertaining to masonry construction includes a study of the properties of stone, brick, mortar, the manner of testing foundations under water, the crib and open caisson process, the pneumatic process, the theory of masonry arches and design, arch centers, selection of site for bridge piers and arrangement of spans, the details of construction of bridge piers and manner of location, specifications for masonry, etc. Text-books, *Howe, Patton, Baker, Rankin*.

[Five hours a week for two terms.]

XIII.

SANITARY ENGINEERING. This course is a study of the principles and methods of drainage and disposal of sewage in populous districts: shape, material and

calculation of sewers; catchbasins, flushing and ventilation; separate and combined systems compared; pollution of rivers; chemical precipitation; results and costs of purification; general municipal and domestic sanitation; inspection of neighboring works. Text-books, *Staler and Pierson*.

[Two hours a week for two terms.]

XIV.

BRIDGES AND ROOFS. This course comprises a study of the different systems of trussed bridges and roof trusses, and the calculation of the strains produced when loaded in any manner, the weight of the structure and the effect of wind included. Both graphical and analytical methods are used. Besides the various systems of trussed bridges, which are studied in detail the plate girders, suspension bridges, cantilever bridges, draw bridges, and roofs of various designs are given equal attention; the purpose being to familiarize the student with the different forms and enable him to design and to estimate the cost of construction. Text-book, *Merriman*.

[Five hours a week for one term.]

XV.

GRAPHIC STATICS. This course teaches the determination of stresses in framed structures by the graphical method. Shearing forces, bending moments, centers of gravity, and moments of inertia are graphically determined by the application of the principles of the force and equilibrium polygons; also the determination of stresses in bridge trusses with parallel chords and with broken chords, caused by uniform loads and locomotive wheel loads; graphical determination of stresses in roof trusses, graphical treatment of the arch symmetrical

and unsymmetrical cases, graphical methods of arches of hinged ends, and of fixed ends; stress diagrams; temperature stresses; braced arches; graphics applied to continuous girders. This course is supplemented by full explanations, notes, examples and problems. Text-book, *Merriman*.

[Five hours a week for one term.]

An elementary course two hours a week for two terms is given to students following the Program in Design and Short Program in Architecture.

XVI.

HYDROMECHANICS. This course is a thorough study of the theory of hydrostatics, hydraulics, and hydrodynamics, to which are added many practical exercises. The subjects admitted are the transmission of pressures, center of pressures; velocity of flow from orifices of various shapes; fluid friction; Bernaulli's theorem with friction: Chezy's formula; Kutter's formula; flow over wires, and through tubes; flow in pipes; loss of head in friction and other losses; flow in conduits, canals, and rivers, velocities in cross sections; methods of gauging the flow, measurement of water power, dynamic pressure of flowing water; designing of waterworks and standpipes; hydraulic motors and relative merits; discussion of water wheels of different types, and a study of the conditions determining high efficiencies; classification of turbines, and a complete study and discussion of the different forms.

[For students in Civil Engineering, three hours a week for two terms.]

[For students in Electrical, Mechanical, Mining and Chemical Engineering, two hours a week* for twenty-two weeks.]

DRAWING, ARTISTIC

In this department the aim is to lay a thorough foundation in drawing for those who wish to make Art a profession, but the courses are so arranged as to be accessible to other students. The system of teaching, which is that followed in the best art schools, is intended to develop the individuality of each student, so that with a good understanding of the principles of art he may interpret nature according to his own temperament.

The work is done altogether from cast, objects and nature. The immediate surroundings of the University buildings, the lakes and the Saint Joseph River offer many beautiful subjects for the study of landscapes, and the classes are taken out in the summer for this study.

To the old collection of casts has been added a new one which was carefully selected at the National School of Fine Arts in Paris, where all the casts are moulded directly from the originals. The collection is as follows:

FULL FIGURE. The Diadumenos (British Museum); the Doryphoros (Naples). These two figures are full size.

The following figures are reduced mathematically: the Discobolus; the Venus of Milo; the Slave of Michael Angelo; the Achilles; the Fighting Gladiator (Louvre); and Houdon's Anatomical Figure.

BUSTS AND HEADS. Asiaticus (Paris); Brutus (Rome, the Capitol); Cato (Rome, and Vatican); Cicero (Rome, the Capitol); Dante (Florence, Uffizi); Agrippa (Louvre); Venus (Vatican); Centurion (Naples); Ariadne (the Capitol); Psyche of Naples (Naples); Vestal (Vatican); Niobe (Vatican); the Two Daughters of Niobe (Florence.)

Among the old busts are the Apollo Belvidere, the Antinous, Bacchus, Juno, Mercury, Demosthenes, etc.,

Besides there is a complete set of decorative and architectural ornaments, taken from monuments of antiquity, the Middle Ages and the Renaissance, and of elements of the human figure (hands, feet, etc.) from the antique and some anatomical pieces.

ELEMENTARY CLASS

I.

(a) Drawing from casts or ornaments purely geometrical, such as mouldings, ovoloes, dentils, etc. Sketching from simple objects.

(b) Drawing from casts of ornaments of which the elements are living forms, such as ornamental leaves and flowers. Sketching from nature, leaves and flowers.

(c) Drawing from architectural elements, such as pedestals, bases, shafts, cornices, etc. Lectures on perspective, direction of the principal lines in relation to the horizon. Elementary notions of the five orders of architecture.

(d) Drawing from casts of the human figure; hands, feet, masks, etc. Architectural ornaments. Sketching from familiar objects.

ANTIQUÉ CLASS

II.

(a) Drawing from the antique, heads and busts. Still life drawing. Sketches of landscapes from nature. Selection of a subject. Composition in landscape. Applications of perspective.

(b) Drawing from the antique, full figure. Occasional studies of the head from the living model. Sketch-

ing from the costumed model. Still life in water colors. History of Art.

III.

LIFE CLASS. Drawing from life. Artistic anatomy. Anatomical studies from the collections of Science Hall. Still life painting in water colors and oil. Landscape painting. Drawing for illustrations.

IV.

SKETCH CLASS. One hour a week. The students have among themselves an organization, "The Crayon Club," the object of which is to sketch college scenes and to do illustrative work; these sketches are brought into class and criticised.

V.

MODELING. In the spring term of the Senior year, Architecture modeling in clay is taken up. The objects modelèd are architectural forms, copied from casts or made from the student's drawings of his own work, as his progress and ability may warrant.

VI.

CLASS OF DECORATIVE DESIGN. The object of this department is to prepare students for professional work in decorative designing of all kinds. They will take up the study of historical ornaments and will be taught the several principles of the arrangement of designs, and from personal sketches of plants and flowers will be shown the art of making original designs for wall paper, book covers, stained glass, carpets, interior decorations, metal plates, etc. No particular program is given out as the teaching is purely individual.

DRAWING, MECHANICAL

Drawing A and B (see pages 201, 203) are required to take up drawing I, II.

Two hours of actual time in drawing are required for each credit hour in the schedule.

I.

FREEHAND. This course consists in sketching with pencil from various models of the different machine parts. Later in the term, the use of instruments is taken up illustrating problems in the Engineering course. Text-book, *Jamison's Elements*.

[Three hours a week for one term.]

II.

PROJECTION DRAWING. The course embraces the principles of projection, methods of shop-drawing, tinting, tracing, blueprinting, lineshading and the preparation of working drawings of complete machines. This course must be preceded by course I. Text-book, *Jamison's Manual*.

[Three hours a week for one term.]

III.

DESCRIPTIVE GEOMETRY. A series of accurate plates is made, illustrating the principles of orthographic and spherical projections, shades and shadows, perspective and isometric projections.

[Two hours a week for two terms.]

IV.

KINEMATIC DRAWING. Designing of cams and gear teeth, complete working drawings of machines involv-

ing the application of kinematics and the computation of dimensions.

[Two hours a week for two terms.]

V.

TOPOGRAPHY. Pen and colored topographical drawing, conventional signs, map drawing from notes taken from surveys. This course must be preceded by Course I. Text-book, *Reed*.

VI.

STEREOTOMY. This course comprises a study of the application of the principles of Descriptive Geometry to the determination of the forms and sizes of the stones used in the construction of the different classes of arches and masonry structures. This course is given by lectures in the drawing room, explaining the construction of templates, and the use of directing instrument; also explanations of methods of drawing plans, elevation and development of oblique arches, wing walls and the like. A certain number of plates and drawings is required, illustrating the methods of performing practical work.

Drawing and designing plans, elevations and sections of masonry construction, foundations, dams, piers, abutments, culverts, and arches. Text-book, *French*.

[Three hours a week for one term.]

VII.

BRIDGE DESIGNING. This course proceeds from simple framed girders to complete bridge-trusses of various designs,—required of Juniors in Civil Engineering. Complete design of a railroad bridge and detail drawings,—a short general course of bridge designing.

[Three hours a week for one term.]

VIII.

MACHINE DRAWING. A continuation of Course I. and II. embracing advanced work in machine drawing and the elementary principles of mechanical design with calculation of dimensions and construction of drawings from sketch-book notes. Text-book, *Low's Machine Drawing and Design*.

[Three hours a week for two terms.]

IX.

FREEHAND. The principles of freehand drawing in pencil and pen from objects, and later from biological specimens, plants, animals and microscopical preparations.

[Two hours a week for two terms.]

X.

FREEHAND. Advanced drawing from plants and anatomical dissections of animals. Illustrations for publications.

[Two hours a week for two terms.]

XI.

WATER COLOR. Drawing in water color from still life and nature.

[One hour a week for one term.]

XII.

RENDERING IN WATER COLOR. The rendering of architectural drawings, including perspectives,—casting of shadows, color treatments of buildings and handling of foreground and background.

[One hour a week for one term.]

XIII.

PEN AND INK. Rendering drawings in pen and ink from studies by noted artists in this branch of art; followed by rendering of original drawings.

[One hour a week for one term.]

ELECTRICAL ENGINEERING

I.

APPLIED ELECTRICITY. A course of lectures and recitations, supplemented by laboratory practice, on the general theory of electricity and magnetism and its application to practical work, as follows: Setting up and testing primary and secondary batteries, systems of call bells, electric and gas lighting appliances, fire and burglar alarms, telegraph and telephone lines, switch boards and accessories. Experiments with induction coils, magnets, switches, voltmeters, ammeters, wheatstone bridges, galvanometers and other measuring instruments. The study of direct current generators and motors, arc and incandescent lighting systems, street railway machinery and appliances, electric heating and forging, electrolytic process, etc. Text-book, *Swoope's Practical Electricity*.

[Five hours a week for two terms.]

II.

APPLIED ELECTRICITY. Lectures and laboratory work on the construction and testing of switches, magnets, measuring instruments, induction coils, etc. The calculation of sizes of wire and location of circuits for lighting and power, the experimental study of alternating current machinery and accessories.

If the student has acquired sufficient skill in handling tools in his workshop, he may design and build a small dynamo, starting with rough castings, doing all the fitting and finishing, winding and adjusting, and finally testing for insulation, efficiency, and adaptability to special purposes. This course must be preceded by Course I. (*Course I, and II. are required in the Short*

Program Electrical Engineering; they are elective for general students and those studying telegraphy.)

[Five hours a week for two terms.]

III.

DYNAMO-ELECTRIC MACHINERY. Recitations on the physical reactions, characteristic curves, mechanical points, theory of armature winding, the mathematical theory of alternating currents, phase relations, modern forms of single phase, and multiphase generators and motors, design of transformers. Text-books, *Sheldon's Dynamo Electric Machines*, *Sheldon and Mason's Alternating Currents*.

[Four hours a week for two terms.]

IV.

ELECTRICAL LABORATORY. Practical work at wiring buildings for lights and power, testing circuits for insulation and grounds, construction and operation of storage batteries, management and care of dynamos, characteristic curves of particular machines under different conditions, efficiency tests of motors by absorption dynamometer methods, alternating current dynamo and transformer tests, the testing of storage batteries, and complete plant efficiency tests. Careful notes are taken.

[Four hours a week for two terms.]

V.

DESIGNING. The designing and making of working drawings of switches, resistance and other electrical apparatus. Calculation of sizes of wire and location of circuits for lighting buildings. Complete drawing of direct and alternating current dynamos. Laying out plants for power and lighting.

[Two hours a week for two terms.]

VI.

DYNAMO MACHINERY. Laboratory. Study of fundamental principles, characteristics of D. C. dynamos, speed and torque of motors, A. C. generators and motors, transformers and accessories, power measurements and efficiency tests.

[Three hours a week for ten weeks.]

VII.

APPLIED ELECTRICITY, LABORATORY AND LECTURES on the use of electricity in buildings, systems of wiring, materials used, the Underwriting requirements for study of bells and telephones, electric lighting, phytometry and illumination. For students in Architecture.

[One hour a week for one term.]

VIII.

POWER TRANSMISSION. Lectures and recitations on pole lines, underground work, limits of voltage, insulators, choice of frequency, cost of construction, depreciation and other financial matters.

[One hour a week for one term.]

IX.

ELECTRIC RAILWAYS. Lectures and recitations on track and overhead construction, cars, trucks, motors and systems of control for both direct and alternating current, sub-stations, operation and financial considerations.

[One hour a week for one term.]

X.

TELEPHONY. Laboratory and lectures on general principles, intercommunicating systems, switchboard systems, manual and automatic, operation, cost of equipment, maintenance and depreciation.

[One hour a week for one term.]

XI.

WIRELESS TELEGRAPHY AND TELEPHONY. Experimental practice and lectures on the theories involved in the construction and operation of the leading systems, oscillators and sending apparatus, detectors and receiving devices, turning to prevent interference.

[Two hours a week for one term.]

XII.

ILLUMINATING ENGINEERING. Lectures on the theory and operation of the various kinds of electric and other lamps, distribution of light and the location of lamps to produce the best illumination, practical problems and the study of particular institutions, the cost per candle power or per candle foot including first cost, attendance, breakage and depreciation.

[Two hours a week for ten weeks.]

XIII.

INSPECTION TRIP TO CHICAGO. Study of the larger power, lighting and telephone installations also factory methods in several typical industrial establishments, trips to the hydraulic and steam generating plants along the St. Joseph river.

ELOCUTION AND ORATORY

I.

READINGS AND DECLAMATIONS. This course is designed to correct defects in pronunciation and emphasis. Each student is required to give two declamations.

[One hour a week for one term.]

II.

READINGS AND DECLAMATIONS. Continuation of Course I. Each student is required to give three declamations.

[One hour a week for one term.]

III.

PRACTICAL ELOCUTION. Exercises in breathing, voice culture, and action. The principles of pronunciation and emphasis and their application in the reading of selections, Text-book, *Fulton and Trueblood's Practical Elocution*.

[One hour a week for one term.]

IV.

PRACTICAL ELOCUTION. Further exercises in breathing, voice culture, action. Quality, force, pitch and time. Minute speeches and declamations. Lectures on the principles of action. Text-book, *Fulton and Trueblood's Practical Elocution*.

V.

ORAL DISCUSSIONS. The application of formal logic to debating. Analysis of selected argumentative speeches, and the preparation of briefs. Courses III. and IV. and a course in logic are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for one term.]

VI.

ORATORY. A study of the great orators of ancient and modern times. Each student is required to write and deliver a biographical oration on one of the great orators. Lectures on methods of public address. Courses III. and IV. above, and course I. in English are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for two terms.]

VII.

SHAKESPEAREAN READING. The critical and artistic reading of two of Shakespeare's plays accompanied with stage action. The students present the play by scenes

before the class. Courses III. and IV. are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for two terms.]

VIII.

ASSEMBLY WORK. This course is designed to supplement the other courses in this department. It consists of debates, short orations, minute speeches, declamations, impromptu and drill work in parliamentary law.

[One hour a week for two terms.]

ENGLISH

I.

GENUNG'S PRINCIPLES OF RHETORIC. A study of the complete text. Frequent practice in simple theme work, versification. Writing in all literary forms and assigned readings.*

[Three hours a week for two terms.]

II.

(a) ESSAY AND ORATION. Intensive study.

[Three hours a week for fourteen weeks.]

(b) POETRY AND THE POETS. Texts, theory and critical study.

[Three hours a week for twenty-two weeks.]

Practice in writing in all literary forms and assigned readings.

III.

FICTION. (a) The Short Story, technically, historically and critically considered.

[Three hours a week for fourteen weeks.]

(b) The Novel, technically, historically and critically considered.

[Three hours a week for twenty-two weeks.]

* Every Freshman will be obliged to follow a class in *correct English*, one hour a week, until his written work gives evidence that he may be dispensed from this special exercise.

Practice in writing in all literary forms and assigned readings.

IV.

THE DRAMA. (a) Hennequin's *The Art of Playwriting*.
[Three hours a week for fourteen weeks.]

(b) Elizabethan Dramatists. Intensive study of Shakespeare.

[Three hours a week for sixteen weeks.]

(c) Modern Drama, from Sheridan to the present time.

[Three hours a week for six weeks.]

Under all the subjects specified attention will be given to current productions with a view of properly acquainting the student with the writers of the day.

GRADUATE WORK IN ENGLISH. Students wishing to do advanced work in English will be provided with library facilities and led through the usual work for the degree of Master of Letters or Doctor of Philosophy.

The major subject on approval of the Faculty of English may be any special aspect of a literary form or epoch, or a comparative study of related authors.

Seminar work, the study of texts, and special lectures by professors make up the course.

GEOLOGY

I.

PRINCIPLES OF GEOLOGY. Lectures, recitations, demonstrations. The study of the general features of the earth; the material composing the accessible parts of the earth; the arrangements of the material in rocks; the causes of geological changes; the history of the earth and the various forms of life that existed in the

different periods of successive geological ages. Text-book, *Brigham*.

[Four hours a week for one term.]

II.

MINERALOGY. The object of this course is to train the student to identify minerals by their physical characteristics, such as crystal form, cleavage, color, hardness and specific gravity without having to resort to blowpipe or chemical tests except in the rare minerals. Recitations are made upon drawers of minerals in which the student points out the distinguishing features by which he recognizes the different minerals. Text-book, *Dana*.

[Five hours a week for two terms.]

III.

MINERALOGY. Lectures, recitations, and laboratory work. A study of crystallography and the classification of minerals, accompanied by practice in the laboratory and museum in the determination of minerals, especially the ores. Blow-pipe analysis. Text-book, *Crosby*.

[Two hours a week for one term.]

IV.

CRYSTALLOGRAPHY. In this course there is made a complete study of the laws in the different systems of crystal formation, by means of laboratory work in models, natural crystals and cleavage specimens. Text-book, *Williams*.

V.

PETROGRAPHY. This course is a study of rocks with regard to their classification, structure, mineralogical constituents, chemical composition and alterations; a study of the physical characters of the minerals shown in thin transparent rock sections with the aid of the

microscope; a practical study of rocks in the hand specimens and also in summer field work.

[Two hours a week for two terms.]

VI.

GEOLOGY, PHYSICAL AND CHEMICAL. A course treating of the origin and alterations of rocks, of general eruptive and earthquake action, metamorphism, faulting, jointing, and mountain building: the action of atmospheric agencies, surface and underground water. All of which subjects are especially considered in their application to mining pursuits. Text-book, *Chamberlain and Salisbury's Geology*.

[Three hours a week for one term.]

VII.

GEOLOGY, ECONOMIC MINING. A study of the genesis of the useful ore deposits, both metallic and non-metallic; an analysis of the relation existing between structural, dynamic and chemical geology, petrography and the ore deposits encountered in mining operations. Frequent reference is made to the bulletins, monographs and reports of the United States Geological Survey. Text-books, *Spurr, Reis*.

[Two hours a week for one term.]

GERMAN

I.

Grammar, *Thomas*. Translation from German into English of simple prose; translation of English exercises into German. Reading of short stories and selections from more difficult prose.

German Reader, *Miller and Wenkelbach*.

[Five hours a week for two terms.]

II.

Grammar, *Thomas*. Translation into German of narrative prose and selections from history. Sight reading of selections from history.

Herman and Dorothea, *Goethe*; Lichtenstein, *Hauff*.
[Four hours a week for two terms.]

III.

Grammar, *Thomas*. Sight reading of plays, poems and prose writing. Translation of selections from history and literature; original essays.

Minna von Barnhelm, *Lessing*; Best known poems, *Heine*; Correspondence, *Schiller-Goethe*.
[Four hours a week for two terms.]

GREEK

I.

HOMER. Iliad. Text Edition.

LYSIAS. Select Orations.

ST. JOHN CHRYSOSTOM. Eutropius. (*Elective*)
Prose Composition.

[Four hours a week for two terms.]

II.

HOMER. Odyssey. Text Edition. (*Elective*)
Selections from Herodotus.

ST. BASIL. De Profanis Scriptoribus.

ST. GREGORY. Machabees. (*Elective*)

Advanced Prose Composition.

[Four hours a week for two terms.]

III.

DEMOSTHENES. The Speech on the Crown, or the Olynthiacs and the Philippics.

THUCYDIDES. One book, *selected*. (*Elective*)

AESCHYLUS. One play, *selected*. (*Elective*.)

SOPHOCLES. Oedipus Tyrannus.

PRIMER OF GREEK LITERATURE. *Jebb*.

[Four hours a week for two terms.]

IV.

EURIPIDES. One play, *selected*.

ARISTOPHANES. One play, *selected*.

PINDAR. Selected Odes. (*Elective*.)

GREEK FATHERS: St. Basil: The Martyr Gordius.—
St. John Chrysostom: The Return of Bishop Flavian.—
St. Gregory Nazianzen: Funeral Oration of Cæsarius.
(*Elective*.)

PLATO. The Apology and Crito.

THESIS. Subject assigned or selected with approval
of the dean. About 2500 words in length.

[Four hours a week for two terms.]

GRADUATE WORK IN GREEK. Advanced courses of instruction in the Greek language and literature will be provided for graduate students who look forward to the Master's or Doctor's degree. The center of work will be the Greek seminar, devoted to the interpretation of passages selected for that purpose by the director of the seminar, and to a critical study of one particular author or of a group of authors in the same department of Greek literature; as for instance, Homer, Plato or the orators, the historians, the dramatists, etc.

The work of the seminar will be supplemented by lectures on the history of comparative philology, on comparative grammar, and on the Greek dialects.

For those who desire a broader basis for their linguistic studies, an elementary course in Sanskrit will be offered.

HISTORY

ANCIENT HISTORY

I.

(a) ANCIENT GREECE to the conquest by Rome of the Hellenic world. Readings and examinations on required texts.

[Four hours a week for one term.]

(b) ANCIENT ROME to the barbarian invasions. Readings, and examinations on required texts.

In both courses the student is required to become familiar with the institutions of the ancient world, and to study the same in *De Coulanges' The Ancient City*.

[Four hours a week for one term.]

MEDIAEVAL AND MODERN HISTORY

II.

(a) THE HISTORY OF THE MIDDLE AGES from the invasion of the barbarians, and the history of the periods of the Renaissance and the Reformation to the French Revolution. Readings, and examinations on required texts.

[Four hours a week for one term.]

(b) THE GENERAL HISTORY OF EUROPE from the French Revolution to the present time. Readings, and examinations on required texts.

[Four hours a week for one term.]

III.

THE HISTORY OF THE BRITISH ISLES TO THE REVOLUTION IN 1769. For the narrative *Gardiner's Student's History* is used as a text and is supplemented by lectures. In the study of the development of political institutions

Feilden's Constitutional History is used. In addition, students shall make free use of the library in preparing special topics upon which they will report in class.

[Four hours a week for two terms.]

AMERICAN HISTORY

IV.

(a) AMERICAN HISTORY FROM ITS BEGINNING TO THE PRESENT TIME. A large part of the work of this and the following course consists in the preparation and presentation in class of special topics by the students. An effort will be made to train the student in the use of original sources as well as in the discriminating use of secondary works. Weekly written tests are given upon the lectures and the assigned collateral reading.

[Four hours a week for two terms.]

(b) AMERICAN CHURCH HISTORY FROM ITS BEGINNING TO THE PRESENT TIME.

[One hour a week for two terms.]

IRISH HISTORY

V.

(a) IRISH HISTORY FROM THE EARLIEST COLONISTS TO THE PRESENT TIME. The purpose of the course is to acquaint the student with the true story of Ireland by presenting a statement of facts. Early Irish religious beliefs, customs, racial characteristics, systems of government are discussed, and specific topics are assigned for research work.

(b) A course of lectures on the modern Celtic move-

ment with a study of the modern Irish writers.
[Four hours a week for one term.]

POLISH HISTORY

VI.

History of the primitive Slavs. The Rise of the Polish Nation. The Epoch of the Piast-Dynasty (962-1386).
The Jagiellonian Epoch (1386-1572).

Poland during the rule of the Elector Kings (1572-1795).

Poland in its Partitions. From 1795 to the present time. Polish Emigration.

No particular text-book is used in this course. It is a lecture-course; and the student is required to read up the principal authors, along the line of the notes gathered from the lecture in class.

RESEARCH WORK IN HISTORY. Facilities are offered to graduate students who wish to do advanced work in history leading to the Master's or the Doctor's degree. Evidence of ability to begin specializing must be given by candidates who have received their Bachelor's degree at another College. The work is directed in the seminar and is supplemented by lectures.

JOURNALISM

I.

History and Development of Journalism up to the present day. Studies of leading journalists in the past.
[Two hours a week for two terms.]

II.

Newsgathering and reporting; preparation of copy; copy-reading; proof-reading; editorial writing. American Politics and Government.

[Five hours a week for two terms.]

III.

Newspaper Administration; Advertising; the Jurisprudence of Journalism; Modern European History and Politics as reflected in the press.

[Five hours a week for two terms.]

IV.

Newspapermaking; Comparative Journalism; Department work. Special lectures on the ethics of Journalism. Special Problems connected with Trades Unions and Combinations of Capital.

[Five hours a week for two terms.]

LATIN

I.

LIVY. Selections. *Dennison*.

VERGIL, Bucolics and Georgics. *Frieze*.

CICERO. De Senectute and De Amicitia. *Shuckburgh-Egbert*.

PROSE COMPOSITION. *Scheier*.

[Five hours a week for two terms.]

II.

CICERO. De Oratore. *Wilkins.*

HORACE. Odes and Satires. *Wickham.*

ADVANCED PROSE COMPOSITION. *Scheier.*

[Five hours a week for two terms.]

III.

LIVY. Book I. *Dennison.*

HORACE. The Literary Epistles and the Ars Poetica.
Wickham.

TACITUS. Agricola and Germania. *Gudeman.*

TERENCE. One Play, *selected.*

ORIGINAL THEMES. (Two a month.)

SEMINAR. Papers on the Authors and their Works.
(Once a month).

[Four hours a week for two terms.]

IV.

QUINTILIAN. De Institutione Oratoria, Book X. and
XII. *Frieze.*

PLAUTUS. Captivi. *Barber*

CICERO. De Officiis. *Crowell*

A THESIS. Subject assigned or selected with approval
of the dean. About 2500 words in length.

[Four hours a week for two terms.]

GRADUATE WORK IN LATIN. Advanced courses of instruction in the Latin language and literature will be provided for graduate students who are candidates for the degree of Master or Doctor. The work will be directed in the seminar and be devoted to a critical study of one particular author or group of authors.

The work of the seminar will be supplemented by lectures on comparative philology and comparative grammar.

MATHEMATICS

I.

ALGEBRA. This course includes a study of the binomial theorem, the theory of logarithms, choice, chance, variables and limits, series, determinants. Then follows a thorough study of the general properties and solution of equations, embracing the subjects of derivatives, transformation, detached coefficients, surd and imaginary roots, incommensurable roots, limits of roots, biquadratic equations, DesCartes' and Cardan's rules; Sturm's theorem, Horner's method. Text-book, *Wentworth*.

[Five hours a week for one term.]

II.

ANALYTIC GEOMETRY. This course includes a study of the point and right line; conic sections; their equations and properties; discussion of the general equation of the second degree containing two variables; different systems of co-ordinates; transformation of co-ordinates; an elementary course in geometry of three dimensions, embracing the point, straight line, plane and surfaces of revolution; transformation of co-ordinates; quadric surfaces and supplementary propositions. Text-book, *Bailey and Woods*.

[Five hours a week for one term.]

III.

CALCULUS, DIFFERENTIAL. This course as also Courses IV. and V. is designed to meet the requirements of Engineering students. It includes a study of the methods for the differentiation of algebraic, logarithmic and exponential, trigonometric, and inverse trigonometric functions, successive differentiation, and differential coefficients; treatment of implicit and compound functions; expansion of functions; indeterminate forms;

partial differential coefficients of the first order and of higher orders; direction of curvature; radius of curvature; envelopes; maxima and minima of functions of one independent variable, and of several independent variables; tracing curves; differentials of arcs, plane areas, surfaces and volumes of revolution. Text-book, *Osborn*.

[Five hours a week for one term.]

IV.

CALCULUS, INTEGRAL. Integration of elementary form and of rational fractions; integration by rationalization and by parts; successive integration; multiple integrals; definite integrals, limits of integration; double integration applied to plane areas; rectification of plane curves; quadratures of plane areas and surfaces of revolution; surface and volume of any solid; intrinsic equation of curve. This course is supplemented by numerous exercises and examples. Text-book, *Osborn*.

[Five hours a week for twelve weeks.]

V.

DIFFERENTIAL EQUATIONS. An elementary course for Engineering students, supplementary to the course of integral calculus. It embraces equations of the first order and degree; equations of the first order, but not of the first degree; singular solutions; linear equations with constant coefficients; special forms of equations with higher orders. Numerous applications to mechanics and physics are introduced during the course. Text-book, *Murray*.

[Five hours a week for six weeks.]

ADVANCED WORK. The prescribed courses in pure mathematics are I. to V. inclusive. The following advanced courses are offered, based on standard authors.

The text-books are not necessarily the same every year. The number of students required to constitute a class in any one subject must be at least five.

(a) Higher Algebra, *Hall and Knight, Smith, Crystal*.
(b) Advanced work in Trigonometry, *Todhunter, Lock*.
(c) Determinants, *Peck, Hanus, Muir*. (d) Theory of Equations, *Burnside and Panton*. (e) Advanced Calculus, *Beyerly, Todhunter, Williamson*. (f) Advanced Analytic Geometry, *Salmon*. (g) Analytic Geometry of Three Dimensions, *Aldis, Frost, Salmon*. (h) Quaternions, *Hardy* with *Kelland* and *Tait* as reference.

[Three hours' recitation a week for one subject.]

MECHANICAL ENGINEERING

I.

THERMODYNAMICS. The subject begins with a theoretical study of the steam engine, gas engine and other heat motors involving the laws of thermodynamics of gases, saturated vapors and superheated steam. The applications of this preliminary work are then dwelt upon, and prime movers, the injector, condenser, refrigerating machinery, boilers and pumps are studied in detail. During the second term a study of the difficult types of internal combustion engines is made together with a general study of costs in operating power plants. Frequent reference is made to trade catalogues, of which an abundant supply should be obtained by the student. Text-book, *The Steam Engine, Holmes*.

[Four hours a week for two terms.]

II.

MATERIALS OF ENGINEERING. This course, supplemented by shop work and laboratory work in testing materials of construction, is designed for the purpose

of acquainting the student with the properties of the material he will use in his profession. Tensile and shearing strength, elasticity and resistance are studied, together with the effects of strain, intermittent loading and impact. The process of manufacture of the most important materials is taken up, and estimates of the cost of construction at market prices complete the work. Text-book, *Thurston's Materials of Engineering*.

[Two hours a week for one term.]

III.

STEAM ENGINE DESIGN. In this course the forms and sizes of steam engines, computation of dimensions and advantages and adaptation of special forms of engines for specific work are taken up, giving the student a thorough knowledge of construction detail. The latest researches and contemporary practice may be consulted in the numerous publications found in the University Library. During the first term of the Senior year is required the complete design with working drawings of a simple non-condensing steam engine for specific purpose. The second term is given to designing a multiple expansion, jacketed, condensing engine for marine service. The text-book used is *Whitham's Steam Engine Design*.

[Five hours a week for two terms.]

- IV.

STEAM BOILERS. This subject is treated much as that of Course III. The determination of sizes of parts from consideration of strains, thickness of shells, size of rivets, braces, furnaces and proper methods of connection of boilers, with efficiency of furnaces and life of boiler are some of the subjects considered. The method of determining the efficiency of fuels, heating surfaces, heights of chimneys, boiler setting

and materials used in connection are also discussed. Text-book, *Steam Boilers* by *Munro*.

[Three hours a week for one term.]

V.

KINEMATICS. This course treats of the geometry of machinery, the determination of the paths of the various parts of an elementary combination and the constraining of the parts to move in these paths. The general theory is then applied to cams and gear teeth, the relative motion of machine parts and the kinematic trains, belts, pulleys, speed cones, link work and other aggregate combinations. *Barr's Kinematics of Machinery* is the text-book used.

[Three hours' recitation and two hours' drawing a week for one term.]

VI.

MACHINE DESIGN. This work involves a study of the form and strength of machine parts as applied in designing, with computation of dimensions for fastenings, bearings, rotating pieces, belt and tooth gearing, etc. The derivation of rational formulæ and the determination of empirical formulæ are included and applied in designing. The text-books used are *Unwin's Elements of Machine Design*, *Low's Handbook for Mechanical Engineers* and *Reed's Machine Design and Drawing*.

[Three hours a week for one term.]

VII.

VALVE GEARS. This includes a complete study of the Bilgram diagram as applied to side valves and the principal automatic cut-off engines. The radical gears, such as Hackworth, Walschaert, Marshall and Joy are treated in the same way, and in conclusion the

student is made familiar with the various types of Corliss valves, shifting eccentrics and link motions. The text-book is *Halsey's Valve Gears*.

[Two hours a week for one term.]

VIII.

MECHANICAL LABORATORY. The work taken up includes a study of the methods of testing the steam engine under varying running conditions, valve setting, calibration of thermometers, gauges and indicator springs, use of Prony brake, Weber and Emerson dynamometers, Pelton water wheel, Weir calibration, etc. Text-book, *Carpenter's Experimental Engineering*.

[Five consecutive hours a week for one term.]

IX.

STEAM ENGINES AND BOILERS. A brief course in the study of boilers and steam engines designed to familiarize the student with the different types in use and their respective merits. Only that theory is taken up which is necessary to the working out of problems, the ultimate object of the course.

Students taking this course must provide themselves with an abundant supply of trade catalogues. Text-book, *Power and Power Transmission, Kerr*.

[Three hours a week for one term.]

X.

GAS AND VAPOR ENGINES. This course, extending over two terms, is given to a general descriptive study of all the types of gas engines and explosive motors. The general construction of gas, oil, vapor engines is studied together with their adaptation to various uses.

Results due to change in ignition, compression and variation of working fluid; methods of speed regu-

lation and government and the details of auxiliaries as, pumps, carburettors, hot tubes, batteries, spark coils and dynamos are dwelt upon. The text-book used is *Gas, Oil and Vapor Engines* by *Hiscox*.

[Five hours a week for two terms.]

XI.

GAS ENGINE DESIGN. A complete study of the thermodynamics and design of the gas engine, by text-book, lectures and drawing board. The major subjects taken up are power, efficiency, economy, forces due to gas pressure and inertia and dimensions of engine parts. *Luke's Gas Engine Design* is the text-book used.

[Five hours' recitation and ten hours' drawing a week for two terms.]

XII.

GAS ENGINE CONSTRUCTION. The complete working up from rough castings and forgings of a small type of gas engine. This is part of the thesis work for students in the Short Program and requires the complete machining and assembling of the engine and must be preceded by Courses X. and XI.

[Three hours a week for two terms.]

XIII.

GAS ENGINE LABORATORY. Indicator practice, commercial efficiency, governing, economy, speed regulation. Experiments in ignition, spark coil construction, carburettors and vaporizers. Test of engine constructed by the student.

[Two afternoons each week for two terms.]

SHOPWORK

XIV.

(a) WOODWORK. Exercises in planing, splicing, framing, scroll sawing and turning.

(b) APPLICATION OF CARPENTRY to pattern making, cores, etc., including parts of machines, pipe joints, cranks and bearings.

(c) FOUNDRY PRACTICE. Setting up and drawing simple and complicated patterns. Lectures on heating and pouring metals for different purposes. Core making.

(d) IRON FORGING, welding, annealing, shaping, tool making, tempering and case hardening.

(e) BENCHWORK in iron, including surface chipping, key setting, draw filing, scraping and polishing.

(f) ACCURATE WORK on the lathe, planer, shafting and milling machines. Construction of machine tools, reamers, taps, twist drills, gear wheels and complete machines.

[Three hours a week for two terms.]

THESIS. Each candidate for a degree in Mechanical Engineering must present for graduation a thesis of considerable magnitude which will exhibit his knowledge of the courses he has followed. It may embrace designing, experimental investigation or original research, in a subject selected by the student and approved by the professor. The major part of the second term, Senior year, is devoted to this work, and graduation is conditional upon the knowledge of mechanical engineering displayed in its preparation.

METALLURGY

I.

METALLURGY. Among the subjects studied in this course are the following—classification of ores, sampling,

crushing, milling practice, roasting and smelting; the various extraction processes of the following metals—gold, silver, copper, lead and zinc, are given special attention; the production of pig iron in blast furnaces.

A trip of inspection is made to smelting plants, blast furnaces and mills (stamps and rolls) in order to familiarize the student with metallurgic plants in operation.

[Three hours a week for one term.]

II.

ASSAYING. This course consists of a series of actual determinations of the quantity and value of gold, silver and lead in the various ores by the crucible and scorification methods of the fire assay; the assaying of gold and silver bullion; determining the strength of cyanide working solutions; the assay of gold bearing cyanide solutions; and wet determinations of copper and zinc.

[Eight hours a week for one term.]

III.

ASSAYING. Chiefly laboratory work. Furnace assaying of the ores of gold, silver and lead. Text-book, *Ricketts*.

[Two laboratory hours a week for one term.]

IV.

ORE DRESSING. A course in which a detailed study is pursued of the various processes of mechanically separating and saving valuable minerals from the valueless gangue of ores, whereby the valuable minerals are concentrated into smaller bulk and weight by discarding a large portion of the waste.

The principal subjects treated are: Preliminary and final crushing by means of rock-breakers, steam and gravity stamps with amalgamation; rolls, Chilian, Huntington; tube and ball mills; screen sizing and

classifying; sand and slime concentrating on jigs, tables and vanners; magnetic separation, pneumatic concentration, oil flotation processes; locating and constructing the mill. The course includes a trip of inspection to a number of the most modern concentrating mills in the lake Superior district where the student engages in practical work in the study of mill construction, operation and efficiency. Text-book, *Richards*.

[Three hours a week for one term.]

MINING ENGINEERING

I.

MINING ENGINEERING, PRINCIPLES OF. This course includes a general study of Mining operations divided into the following subjects: Occurrence of minerals in the earth's crust, discovery, boring, excavation, supporting excavations, exploitation, haulage, hoisting, drainage, ventilation, lighting, access, ore dressing and treatment. Text-book, *Foster and Brough*.

II.

MINE SURVEYING. A study of the subject of surveying in its special application to mines, through lectures, plotting of problems and recitations; for students who take the summer course in the mines. The following subjects receive particular attention—recording of notes in underground traverses and their subsequent plotting, a comparison of metal mine and coal mine surveys, the methods of connecting surface with underground surveys by means of both the auxiliary telescope and plumb lines and the deputy mineral surveyor's methods of surveying mining claims for patent. Each student is required to make a complete mine map from notes of actual mine surveys. Text-book, *Trumbull*.

[Three hours a week for one term.]

MICROSCOPY

I.

MICROSCOPY. Lectures and laboratory work. Refraction and dispersion of light and illumination. The index of refraction in different media. Different shapes of lenses. Spherical and chromatic aberration. The selection and care of a good microscope. The use of accessories for advanced work; immersion and adjustable objectives, camera lucida, sub-stage condenser, polarizer, micrometers, etc. Special work in photomicrography. Text-book, *Gage*.

[Two hours a week for two terms.]

II.

MICRO-CHEMISTRY. Laboratory work. The preparation of micro-chemical reagents and their application in testing, fixing, hardening, staining, cleaning and mounting tissues and organs.

[One laboratory hour a week for one term.]

MUSIC

FIRST YEAR

I.

VIOLIN. Studies by Wichtl, Ries, Mazas, Kreutzer, Fiorillo. Compositions by Dancla, DeBeriot, Sitt.

II.

PIANOFORTE. Koehler's and Damm's *Piano School*. Studies by Loeschorn, Berens, Czerny, Heller. Sonatinas and easy sonatas by Clementi, Haydn, Reinecke and Mozart. *Jugend Album* and *Kinderscenen* by Schumann.

III.

VOICE PRODUCTION. Tone placing. Diaphragmatic breathing-control. Articulation. Text-book, Shakespeare's *Art of Singing, Part I.*; Koflers's *Art of Breathing*; *Studies* by Bassini, English songs.

VOCAL SIGHT READING. Elementary theory of Music. Intervals and ear-training. Choir practice.

IV.

ORGAN. *Rink* Organ School. Eugene Thayer *Studies, Light Preludes and Fugues* by Bach.

SECOND YEAR

Ia.

VIOLIN. Studies by Rode, Schradieck, Dont. Sonatas, and pieces by Tartini, Bach, Beethoven, Mozart.

IIa.

PIANOFORTE. Studies by Czerny, Heller, Hasert, Lecouppy; Cramer, Krause. Octave studies by Turner. Bach's preludes, fugues and inventions. Sonatas and pieces by Mozart, Haydn, Beethoven, Mendelsohn, Schumann, Schubert.

IIIa.

VOICE PRODUCTION. Advanced breathing exercises. Study of the chest and falsetto registers. Stroke of the glottis. Text-books, Shakespeare's *Art of Singing, Parts II. and III.* Studies from Italian operas; French and English songs.

VOCAL SIGHT READING. Phrasing, punctuation and advanced study. Practice in operatic chorus-work.

IVa.

ORGAN. Schneider-Warren *Pedal Studies*. Easy sonatas by Mendelsohn, Merkel, Rheinberger. Preludes, fugues by Bach. *Twenty Studies* by Whiting. *Canonic Studies* by Chadwick.

Va.

HARMONY. Construction and use of chords. Harmonizing from figured bass. Text-books, Goetshius *Tone Relations*; Logier's *Harmony*.

THIRD YEAR

Ib

VIOLIN. Sonatas by Bach. Studies by Schradieck-Alward, Wieniawski. Concertos and pieces by Spohr, Vieuxtemps, Mendelsohn, Dvorak.

IIb.

PIANOFORTE. *Gradus ad Parnassum*. Clementi-Tausig, *Das Wohl Temperirte Klavier* by Bach. *English and French Suites* by Bach. *Etudes* by Harberbier and Henselt. Sonatas, concertos and pieces by Beethoven, Weber, Mendelsohn, Chopin, Schubert and Grieg.

IIIb.

VOICE PRODUCTION. Study of trill, mordent, gruppetto, etc. *Messa de Voce*.

IVb.

ORGAN. Sonatas, preludes and *Chorale Vorspiele* by Bach. Concert pieces by Handel, Merkel, Salome, Whistling, Best, Rheinberger.

HARMONY. Counterpoint. Simple two and four part counterpart; double and florid counterpart. Canon, fugue.

FOURTH YEAR

Ic.

VIOLIN. Studies by Paganini. Concertos and pieces by Beethoven, Brahms, Burch, Joachim and others.

IIc.

PIANOFORTE. Studies by Tausig and Chopin. Sonatas, concertos and concert pieces by Schumann, Grahms, Rubinstein, Liszt.

IIIc.

ORGAN. The greater preludes, fantasies and fugues of Bach. Sonatas and concert pieces by Thiele, Widor, Dubois, Builment and Saint-Saens.

IVc.

HARMONY. Composition. Construction of musical forms, *i. e.*, the sonata, rondo, etc. Practical application in an original manner of these forms. Orchestration.

ORCHESTRAL INSTRUMENTS

Instruction is also given on the viola, flute, piccolo, cornet, trombone, guitar and mandolin.

Opportunity is given to the advanced students of playing in the University Orchestra and the University Band.

SINGING CLASS

There is an organization of musical students open only to those taking lessons in vocal music; the Choir and the Glee Club are selected from the members of this class.

PHARMACY

I.

ELEMENTS OF PHARMACY—Lectures and recitations on the art and science of pharmacy, and demonstrations of the various pharmaceutical processes.

[Three hours a week for two terms.]

II.

GALENICAL PHARMACY. A laboratory course to accompany Course I. This course consists of the practical application of the pharmaceutical processes to the manufacture of official preparations of the United States Pharmacopœia and of unofficial and N. F. preparations.

[Five hours a week for twenty-six weeks.]

III.

INORGANIC PHARMACY. Laboratory, demonstrations and recitations. A thorough course in the preparation and testing of pharmaceutical and technical chemicals.

[Six hours a week for one term.]

IV.

GENERAL PHARMACY. A systematic classification of organic and inorganic drugs and preparations from a pharmaceutical standpoint followed by a close study of each of the classes.

[Two hours a week for two terms.]

V.

MAGISTRAL PHARMACY. Includes the manifold methods of extemporaneous pharmacy with consideration of incompatibility, posology, and the principles of elegant pharmacy. Dispensing and prescription practice.

[Three hours a week for one term.]

VI.

(a) PHARMACEUTICAL CHEMISTRY. Chiefly assaying, testing and manufacturing. Determination of melting and boiling points, and solubilities. Some attention is given also to toilet and commercial preparations with a view to the invention and development of original formulas.

[Six hours a week for one term.]

(b) PHARMACEUTICAL PHARMACY. Assaying and manufacturing.

[Six hours a week for one term.]

VII.

GENERAL PHARMACY. Pharmaceutical analysis and assaying, micro-chemical, polariscopic and spectroscopic estimations. Incompatibilities and methods of manufacture.

[Five hours a week for one term.]

VIII.

MATERIA MEDICA. This work embraces a detailed consideration of botanical drugs, their pharmaceutical definition and description, constituents, habitat, therapeutic action, use, dose and antidote. Attention is

given also to mineral drugs and those of animal origin. They are studied individually at first then in classes or groups. The grouping is so arranged as to make the subject comparatively easy for the student.

[Three hours a week for two terms.]

IX.

PHARMACEUTICAL ARITHMETIC. This work includes a study of weights and measures, percentage, relationship of systems, reducing and enlarging formulas, alligation and chemical problems.

[Three hours a week for one term.]

X.

PHARMACOGNOSY. The identification of preparations and crude drugs by their physical properties with special reference to quality and detection of adulteration. Attention is also given to the methods of preventing loss by improper storage or by the ravages of insects. Important drugs are studied under the microscope in cross section and in powder form.

[Three hours a week for one term.]

XI.

COMMERCIAL PHARMACY. A brief course in business method, store-management, banking, accounting, and everything connected with the commercial side of pharmacy. Likewise a number of lectures on Pharmaceutical Jurisprudence and Commercial Law.

[Two hours a week for one term.]

PHILOSOPHY

I.

(a) PHYSIOLOGICAL PSYCHOLOGY. This course is a fairly comprehensive treatment of the physical basis of consciousness.

(b) EXPERIMENTAL AND DESCRIPTIVE PSYCHOLOGY.

The primary laws of consciousness; psycho-physical methods and results.

(c) RATIONAL PSYCHOLOGY. The problems of the mind. Nature, origin and destiny of the soul.

[Courses *a*, *b* and *c* are consecutive. Lectures three hours a week for two terms.]

(d) LABORATORY EXERCISES. Experiments will be conducted with special reference to their value as aids to introspection. *Sanford's Manual of Experimental Psychology*, *Titchener's Experimental Psychology, Vol. I.*

[One hour a week for two terms.]

II.

(a) ELEMENTS OF EPISTEMOLOGY.* A study of the Scholastic theory of knowledge in relation to the teachings of Descartes, Leibnitz, Locke, Berkley, Hume, Kant and Spencer.

(b) LOGIC. *Turner's Lessons in Logic.*

[Four hours a week for one term.]

(c) ETHICS. The theory of morals, with special reference to practical problems.

[Four hours a week for one term.]

III.

(a) GENERAL METAPHYSICS. Transcendental concepts: their value in different systems of philosophy.

[Two hours a week for one term.]

(b) COSMOLOGY. The fundamental concepts of the natural sciences in relation to Thomistic philosophy.

[One hour a week for one term.]

(c) THEODICY. The existence of God; His attributes; His presence in the universe.

[One hour a week for one term.]

* This course is intended to be introductory to Logic and General Metaphysics and will be given at the beginning of the year.

(d) OUTLINES OF THE HISTORY OF PHILOSOPHY.
Turner's History of Philosophy.

[Four hours a week for one term.]

(e) STUDENT DISCUSSIONS. From time to time throughout the year students will be required to read and discuss papers on various subjects in the field of philosophic inquiry.

There is likewise a regular course in Scholastic Philosophy given in Latin. Students are free to elect the course in English or Latin.

GRADUATE WORK IN PHILOSOPHY. Graduate work in the department of philosophy, leading to the degree of Master or Doctor, may be undertaken by students who have pursued the courses described above. Candidates who have made undergraduate studies elsewhere must give evidence of ability to begin specializing at once. In the first and second years, research work will be conducted in the seminar and the psychological laboratory. In the last year, students will have the benefit of frequent consultation with the professors.

PHYSICS

I.

(a) PHYSICS. Instruction in Physics is given by lectures and recitations in which the general laws of mechanics, heat, acoustics, optics, electricity and magnetism are presented. The course is intended to meet the needs of those who desire a general knowledge of the subjects, as well as to lay the foundations for advanced work. Particular attention is paid to the correct statement of principles, so that in his advanced work the student will have nothing to unlearn or relearn. Text-book, *Carhart and Chute.*

[Three hours a week for two terms.]

(b) THE LABORATORY WORK of this course consists of a series of experiments which verify and apply practically the fundamental principles of physics. The student also receives instruction in the use and careful handling of apparatus, accurate observation, and correct deduction of results. Neat and concise reports of all experiments are kept by each student and form the basis for the grades in his work.

[Two hours a week for two terms.]

II.

GENERAL PHYSICS. In this course there is a more extended treatment of the same subjects than is given in Course I. Mathematical principles are applied to physical phenomena. Special attention is paid to accuracy in the mathematical work and in the statements of the principles involved. Lectures and recitations. Text-book, *Crewe*.

[Three hours a week for two terms.]

III.

PHYSICS. The application of mathematics in physical work. Measurements of length, mass and time. Work in mechanics, heat, light, sound; electricity and magnetism. The work is done in the laboratory and the student is taught to depend on his own resources and to check his results.

[Two laboratory hours a week for two terms.]

IV.

PHYSICAL LABORATORY. Special advanced work in heat, light, mechanics, sound, electricity and magnetism. Accuracy in observation and in the calculation and recording of the results is required. Students may specialize here according to the program which they

are following. This course must be preceded by Courses II. and III.

[Three hours a week for one term.]

V.

ELECTRICAL MEASUREMENTS. Laboratory practice with galvanometers, voltmeters, ammeters and wattmeters, resistance work, the relation or equivalence between electric energy and heat, capacity and inductance, insulation tests.

[Three hours a week for one term.]

VI.

CALORIMETRY. Accurate work in laboratory, using methods of mixtures, bomb and other calorimeters in measuring the calorific values of gaseous and solid fuels, quantitative measurements of radiation and conduction of heat as applied to pipe coverings, etc.

[Three hours a week for ten weeks.]

VII.

METEOROLOGY. A government station was installed at the University by the United States Weather Bureau in March, 1912. An elementary course in meteorology is offered to students.

[One hour a week for one term.]

RESEARCH WORK. Courses are offered in Theory of Heat, Theory of Electricity and Magnetism, Optics, the Constitution of Matter, Conduction of Electricity by Gases, Theory of Sound, Hertzian Waves. Calculus required to take up any of these topics.

[Two to five hours a week for one term.]

PHYSIOLOGY

I.

(a) This course comprises lectures, recitations and

demonstrations based upon *Thornton's Text-book of Human Physiology*. A liberal supply of models, charts and manikins are at hand to facilitate all demonstrations required.

(b) Laboratory work consisting of a selected number of experiments so arranged as to give the student a fair insight into modern experimental physiology.

(c) A limited number of microscopical preparations are required to be made by each student, and he must examine a set of typical preparations in order to acquire a fair knowledge of the microscopical structure of the tissues and organs of the human body.

(d) During the course special lectures will be given upon personal, domestic and municipal hygiene.

[Four recitations and one laboratory period for twenty-two weeks.]

N. B.—Students of Pharmacy must take sections (a) and (d) and may select either (b) or (c).

II.

(a) This course comprises a complete study of human physiology such as is required of students of medicine. The lectures, recitations and demonstrations are based upon *Kirk's Handbook of Physiology* and *Hall's Text-book of Physiology*. The student will have free access to a copy of *The American Text-book of Physiology* for special reference.

(b) Laboratory work in experimental physiology. The manual used is *Hall's Experimental Physiology*, but the student will have free access to a number of other similar works,

[Four recitation hours and two laboratory periods for two terms.]

POLITICAL SCIENCE
ECONOMICS

THE ELEMENTS OF ECONOMICS. A general survey of the subject based upon the study and discussion of *Seager's Introduction to Economics*. The first part of this course deals with the fundamental principles of the abstract theory of economics. The second portion of the work has to do with the application and exemplification of these principles. In this connection attention is paid to the subject of money, credit and banking, the labor movement, monopolies, the railroad problem, socialism, taxation, and plans of economic reform. Supplementary readings and reports on current discussions of these questions form an important part of the work in this course.

[Four hours a week for two terms.]

II.*

INDUSTRIAL HISTORY AND THE HISTORY OF ECONOMIC THOUGHT. The work in this course is based on *Ingram's History of Political Economy*, with *Ely's Evolution of Industrial Society* as a supplementary text. After a resumé of the economic ideas of ancient Greece and Rome and the medieval period the work is divided into three sections; the first dealing with the fragmentary notions preceding Adam Smith and including the latter's work and influence; the second period deals with the classical school of economists, particular attention being paid to the theories of Malthus, Mill and Ricardo—the dependance of some of the modern movements on their theories is also shown; the third has to do with the latter day economists. Political Science I. is a prerequisite for Course II.

[Four hours a week for one term.]

* Not given in 1912-'13.

III.

(a)* MONEY, CREDIT AND BANKING. This course first outlines the historical aspect of money and of banking and then takes up the problems touching on these subjects. Special attention is paid to the monetary experiences of the United States and the present reforms under consideration. The text-book used is *Money and Banking*, by *White*.

[Four hours a week for one term.]

(b) DISTRIBUTION. Lectures, readings and discussions on the questions of wages, rent, interest and profits, and the problems resulting from present notions in regard to these matters. The text-book used is *The Distribution of Wealth* by *Carver*, supplemented by readings.

[Four hours a week for one term.]

IV.

PUBLIC FINANCE. This course begins with a brief history of the different financial systems. The different kinds of government expenditure are discussed, also the sources of government income. The different methods of taxation and the proposed reforms in these methods are studied. Special attention is paid to problems in the United States. The text-book used is *Introduction to Public Finance* by *C. C. Plehn*.

[Four hours a week for one term.]

POLITICS

V.

THE ELEMENTS OF POLITICS. General survey. Text, *First Principles in Politics*, *Lilly*.

[Two hours a week for one term.]

* Not given in 1912-'13.

VI.

AMERICAN GOVERNMENT AND POLITICS. Text, *Actual Government*, Hart.

[Two hours a week for one term.]

VII.

JURISPRUDENCE. A course covering (a) the outlines of the Science of Law. (b) The elements of International Law. (c) Lectures on selected topics of Roman and Canon Law. Lectures, readings, and examinations on required texts.

SOCIOLOGY

VIII.

THE ELEMENTS OF SOCIOLOGY. Text, *Elements of Sociology*, Giddings.

[Four hours a week for one term.]

GRADUATE WORK IN POLITICAL ECONOMY. Advanced courses in economics, politics and sociology are provided for graduate students who wish to receive the degree of Master or Doctor.

ROMANCE LANGUAGES

These courses include the study of French, Spanish, Italian, Polish, Portuguese, Old French, Provençal.

The principal aim is to impart an accurate reading knowledge of literary works written in these languages. In the study, however, of Old French and Provençal, special attention will be paid to philology.

FRENCH

I.

Grammar with written and oral exercises; the inflection of nouns and adjectives, the use of all the

pronouns, the conjugation of regular and common irregular verbs; the correct use of moods and tenses, the essentials of French syntax, and the common idiomatic phrases. Reading of three of the following works: *La Tache de Petit Pierre*, Mariet; *Un Cas de Conscience*, Gervais; *La Main Malheureuse*, Guerber; *Sans Famille*, Malot; *Readings from French History*, Super.

[Five hours a week for two terms.]

II.

Advanced grammar with composition, study of idioms, memorizing. Dictations and conversations on practical topics, and careful reading of five of the following works: *Le Voyage de M. Perrichon*, Labiche; *Roman d'un Jeune Homme Pauvre*, Feuillet; *Fables Choisies*, La Fontaine; *Le Medecin Malgre Lui*, Molière; *Le Cid*, Corneille; *Esther*, Racine; *Pages oubliées de Chateaubriand*; *La Question d'Argent*, Dumas; *Standard French Authors*, Guerlac.

[Five hours a week for two terms.]

III.

The study of this course is devoted chiefly to the prose and poetry of the nineteenth century and includes composition, conversation, history and general view of French literature; besides a translation and criticism of the best writers, such as; *Causeries du Lundi*, Ste., Beuve; *On Rend l'Argent*, Coppée; *Hernani*, Hugo; *Méditations*, Lamartine; *Athalie*, Racine; *L'Avare*, Molière; *Mlle. de la Seiglière*, Sandeau; *Les Origines de la France Contemporaine*, Taine; *Expédition de Bonaparte en Egypte*, Thier; *Ste. Elizabeth de Hongrie*, Montalembert; *Histoire de la Littérature Française*, Duval.

[Four hours a week for two terms.]

N. B.—The works studied are not necessarily the same every year.

SPANISH

I.

General outlines of grammar with composition. Translation of easy tales from *Trueba*, *Fernon Caballero*, *Pérez Escrich*, etc., with select fables of *Samaniego*, and *Irate*.

[Five hours a week for two terms.]

II.

Spanish prose and poetry of the eighteenth and nineteenth centuries, with composition and the history of the literature of the period.

[Five hours a week for two terms.]

III.

Literature of the sixteenth and seventeenth centuries; *Cervantes*, *Calderon*, *Lope de Vega*. History of the literature of the period, with essays in Spanish.

[Four hours a week for two terms.]

IV.

Early Spanish. *El Poema del Cid*. History of the literature of the fifteenth century.

ITALIAN

A two years' course. The chief work of the courses is a critical study of *Dante's Divina Commedia*. Reading from *Tasso*, *Aristo's Satires* and *Manzoni*.

[Two hours a week for two terms.]

POLISH

I.

POLISH LANGUAGE AND LITERATURE. Grammar (*Matecki's Part I.*) Etymology. Exercises in spelling and reading.

Grammar, *Part II.* Syntax. Exercises in Composition. Short essays.

II.

RHETORIC. (*Galle's Text-book*). Study of Essays in Models. (*Krasnowilski's Handbook*).

III.

LITERATURE. *The History of Polish Literature. Part I.* From the beginning to the era of Adam Mickiewicz. (*Handbook: Tarnowski-Prochnicki*).

IV.

LITERATURE. *The History of Polish Literature. Part II.* From Adam Mickiewicz to the present time. (*Handbook: Tarnowski-Prochnicki*). Essays.

PORTUGUESE

I.

Portuguese Conversation Grammar, Wall. Readings: *Perfil do marquez de Pombal, Camillo Castello Branco; Novellas Historicas, Pinheiro Chagas; Lendas e Narrativas, Herculano; Campo de flores, Joao de Deus.*

[Five hours a week for two terms.]

II.

Sermoes, Padre Antonio Vieira. Os Lusíadas, Camoes. History of Portuguese literature.

OLD FRENCH

Special attention will be paid to the laws underlying the formation of the French language from the popular Latin. For this purpose a work like *Brachet's Grammaire Historique* will be studied. It is under this point of view that the old French authors will be read, especially *La Chanson de Lohand*.

PROVENÇAL

Language and literature, with reading from the works of the Troubadours.

[Five hours a week for two terms.]

ZOOLOGY

I.

This course comprises:

(a) Lectures, recitations and demonstrations based upon *Nicholson's Text-book of Zoology*.

(b) Lectures, readings and recitations based upon *Parker's Elementary Course in Biology*.

(c) Laboratory work on Invertebrata as outlined in *Pratt's Invertebrate Zoology*, and *Parker's Biology*.

(d) Mammalian Osteology including the study of one or two types of skeletons belonging to each order of mammalia. The work is outlined in *Kirsch's Elementary Course in Mammalian Osteology*.

[Two recitation hours and three laboratory periods for first term; three recitation hours and three laboratory periods for the second term.]

II.

This course comprises:

(a) Recitations, lectures and demonstrations based upon *Hertwig's Manual of Zoology*.

(b) Laboratory work upon some Invertebrate in order to complete and supplement the work under (c) in Course I.

(c) Dissection and laboratory work upon one of two types in each of the classes of Vertebrate, viz.: fish, frog, newt, turtle, snake, mammal; the text-book used is *Pratt's Vertebrate Zoology*.

(d) A more extended study of mammalia with reference to the cat as outlined in *Davison's Mammalian Anatomy*.

(e) An outline of comparative Embryology of animals. Text-book, *Packard and Foster and Balfour*.

PREPARATORY SCHOOL

INSTRUCTORS IN THE PREPARATORY
SCHOOL

REV. WILLIAM MOLONEY, C. S. C.,
Elocution.

REV. JOSEPH MAGUIRE, C. S. C.,
Chemistry.

REV. PATRICK CARROLL, C. S. C.,
English.

REV. JULIUS A. NIEUWLAND, C. S. C.,
Science.

REV. WALTER J. LAVIN, C. S. C.,
Mathematics.

REV. JAMES McMANUS, C. S. C.,
Christian Doctrine.

REV. JOHN FARLEY, C. S. C.,
Christian Doctrine.

REV. J. LEONARD CARRICO, C. S. C.,
English.

REV. THOMAS IRVING, C. S. C.,
Physics.

REV. CHARLES L. DOREMUS, C. S. C.,
French.

REV. GEORGE McNAMARA, C. S. C.,
English and Mathematics.

BRO. PHILIP NERI, C. S. C.,
Penmanship.

BRO. CYPRIAN, C. S. C.,
Bookkeeping, Phonography, Typewriting.

CHARLES PETERSEN, A. M.,
German.

JAMES HINES, PH. B.,
History and Mathematics.

FRANCIS A. DERRICK, A. B.,
Greek and Latin.

JESSE E. VERA, M. E.,
Mathematics.

JOHN F. O'HARA, PH. B.
Spanish.

JOHN M. COONEY, A. M.,
English and History.

THOMAS STEINER, C. E.,
Mathematics.

EMILE V. MOLLE, A. B.,
German.

JOHN LORIMER WORDEN, B. S.,
Drawing and Science.

EDWARD CLEARY, LITT. B.,
Civics and Commercial Law.

EDMUND DOLEWCZYNSKI, A. B.,
Polish.

FREDERICK INGERSOLL,
Violin.

CARL SAUTER,
Piano.

HENRY KUHLE, PH. B.,
Mathematics.

GUILLERMO PATTERSON, JR., M. S.,
Chemistry.

BERTRAM G. MARIS,
Director of Gymnasium.

PREPARATORY SCHOOL

The University maintains a fully equipped Preparatory School under the same general government as the Colleges, but having its own special corps of instructors. The schedules of studies are arranged to meet the need of thorough preparation for collegiate work, and embrace courses which, while giving as wide an education as can be obtained in the very best High Schools, prepare students directly for the group of studies they may select when entering the Freshman year. Four different programs of instruction are offered to students, each containing such special courses as directly meet the needs of the eighteen college groups, while all embrace common subjects which are indispensably necessary in acquiring a fairly liberal education. The period of instruction covers four years.

The equipment and facilities for study in the Preparatory School are most complete. The laboratories are extensive and fully supplied with the latest improved appliances. The classes pursuing any subject are divided into sections, each containing a limited number of students. The sections are purposely limited in order that each student may receive close attention from the instructor in every recitation and laboratory period.

Examinations for admission are held at the opening of the School in September and embrace the subjects completed in the highest grade in the Grammar School. The expense for tuition, board, laundry, etc., will be found on pages 35, 36, and 37. The following fees are special to the Preparatory School:

LABORATORY FEES

Science C.—Elementary Botany.....	\$ 2.50
Science D.—Elementary Zoology.....	2.50
Science E.—Elementary Chemistry.....	5.00
Science F.—Elementary Physics.....	5.00

STUDIES PREPARATORY FOR THE DEPARTMENT OF CLASSICS IN THE COLLEGE OF ARTS AND LETTERS

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
Latin	5	A	Latin	5	A
English	5	A	English	5	A
History	5	A	History	5	A
Mathematics	5	A	Mathematics	5	B
Science	5	B	Science	5	D

SECOND YEAR

Latin	5	B	Latin	5	B
Greek	5	A	Greek	5	A
English	5	B	English	5	B
History	5	B	History	5	B
Mathematics	5	C	Civil Governm't	5	A

THIRD YEAR

Latin	5	C	Latin	5	C
Greek	5	B	Greek	5	B
English	5	C	English	5	C
History	5	C	Mathematics	5	E
Mathematics	5	D	Mathematics	5	D

FOURTH YEAR

Latin	5	D	Latin	5	D
Greek	5	C	Greek	5	C
English	5	D	English	5	D
Science or	5	E	Science or	5	E
Science	5	F	Science	5	F

Studies Preparatory for the Departments of Letters,
History and Economics, and Journalism in
the College of Arts and Letters

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
Latin	5	A	Latin	5	A
English	5	A	English	5	A
History	5	A	History	5	A
Mathematics	5	A	Mathematics	5	B
Science	5	B	Science	5	D

SECOND YEAR

Latin	5	B	Latin	5	B
French or German	5	A	French or German	5	A
English	5	B	English	5	B
History	5	B	History	5	B
Mathematics	5	C	Civil Governm't	5	A

THIRD YEAR

Latin	5	C	Latin	5	C
French or German	5	B	French or German	5	B
English	5	C	English	5	C
History	5	C	Mathematics	5	E
Mathematics	5	D	Mathematics	5	D

FOURTH YEAR

Latin	5	D	Latin	5	D
French or German	4	C	French or German	4	C
English	5	D	English	5	D
Science or Science	5	E	Science or Science	5	E
	5	F		5	F

STUDIES PREPARATORY FOR THE COLLEGE OF SCIENCE

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
English	5	A	English	5	A
Mathematics	5	A	Mathematics	5	B
Latin	5	A	Latin	5	A
Science	5	A	Science	5	D
History	5	A	History	5	A

SECOND YEAR

English	5	B	English	5	B
Mathematics	5	C	Civil Governm't	5	A
History	5	B	History	5	B
Science	5	B	Science	5	C
Latin	5	B	Latin	5	B

THIRD YEAR

English	5	C	English	5	C
Mathematics	5	D	Mathematics	5	D
German	5	A	German	5	A
Science	5	E	Science	5	E
History	5	C	Mathematics	5	E

FOURTH YEAR

English	5	D	English	5	D
German	5	B	German	5	B
Science	5	F	Science	5	F
Mathematics	5	F	Drawing	4	B
Drawing	4	A			

STUDIES PREPARATORY FOR THE COLLEGES OF ENGINEERING AND ARCHITECTURE

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
English	5	A	English	5	A
Mathematics	5	A	Mathematics	5	B
History	5	A	History	5	A
Science	5	A	Science	5	D
*German	5	A	German	5	A

SECOND YEAR

English	5	B	English	5	B
Mathematics	5	C	Civil Governm't	5	A
History	5	B	History	5	B
Science	5	B	Science	5	C
German	5	B	German	5	B

THIRD YEAR

English	5	C	English	5	C
Mathematics	5	D	Mathematics	5	D
History	5	C	Science	5	E
Science	5	E	German	5	C
German	5	C			

FOURTH YEAR

English	5	D	English	5	D
Mathematics	5	E	Mathematics	5	F
Drawing	4	A	Drawing	4	B
Science	5	F	Science	5	F
			*		

* French or Spanish may be substituted for German.

PREPARATORY DEPARTMENT

CIVIL GOVERNMENT

A.

This is a study of the science of government in connection with American institutions, and is intended to give the student some knowledge of the general principles of government and of the American Constitution. The subject begins by defining government; then is considered the object and necessity of government; origin of civil society; the principle of suffrage; different forms of government defined and compared; theories of representation. These topics necessarily are treated briefly, as the principal part of the course consists of a study of the Colonial government, the Articles of Confederation and their defects, the formation of the Constitution and its adoption. The study further comprises a critical analysis of each article and section of the American Constitution, thus enabling the student to acquire a clear conception of the division of powers of the National Government and the duties and responsibilities of each department. Text-book, *Government by State and Nation*, by James and Sanford.

[Five hours a week for one term.]

DRAWING

A.

This work is based on the rudiments of drawing and consists of the training necessary for the hand and the eye. Sketching is also done from simple objects of various forms.

[Four hours a week for one term.]

B.

Courses in Lettering and Geometrical Drawing in pencil and in pen and ink, preparatory to Drawing I. in the Engineering Programs. A sufficient number of plates must be made by each student to prove his fitness for Drawing I.

[Four hours a week for one term.]

ENGLISH

A.

(a) Review of Grammar. General Rhetoric. Daily exercises in Good English, and weekly exercises in prose composition.

(b) Elements of Versification. Verse-writing and memory work in Poetry.

(c) Readings: Irving's *Sketch Book*; Stevenson's *Treasure Island*; Longfellow's *Evangeline*; Cooper's *Last of the Mohicans*; Poe's *Tales*; Hawthorne's *Great Stone Face*, *The Birthmark* and other stories; Palgrave's *Golden Treasury*; Hale's *The Man Without a Country*; Aesop's *Fables*; the *Merchant of Venice*, *Julius Caesar*.

[Five hours a week for two terms.]

B.

(a) Special Rhetoric. American Literature: exercises in Correct English and theme work in the Prose Forms.

(b) The Verse Forms. Theory, practice and memory work.

(c) Readings: Blackmore's *Lorna Doone*; Poe's *Poems*; Lamb's *Essays of Elia*; Scott's *Ivanhoe*, *The Lady of the Lake*; Coleridge's *The Ancient Mariner*; George Eliot's *Silas Marner*; Longfellow's *The Courtship of Miles Standish*; *Macbeth*, *As You Like It*.

[Five hours a week for two terms.]

C.

(a) History of English Literature. Written work in prose and verse.

(b) Memory work in poetry and prose.

(c) Readings: Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, *The Passing of Arthur*; Washington's *Farewell Address*; Webster's *First Bunker Hill Oration*; Carlyle's *Essay on Burns*; Chaucer's *Prologue*; Bacon's *Essays*; Goldsmith's *Vicar of Wakefield*; Thackeray's *Henry Esmond*; *King Lear*, *The Tempest*.

[Five hours a week for two terms.]

D.

(a) Review of Grammar and Rhetoric. Special work in the literary types. Written work in prose and verse.

(b) Memory work in poetry and prose.

(c) Readings: Tennyson's *Idylls of the King*; Gate's *Selections from Newman*; Newman's, *The Dream of Gerontius*; *Hamlet*; *A Midsummer Night's Dream*; other selections illustrative of the text-work given.

[Five hours a week for two terms.]

FRENCH

-A.

Grammar with written and oral exercises; the inflection of nouns and adjectives, the use of all the pronouns, the conjugation of regular and the common irregular verbs; the correct use of moods and tenses, the essentials of French syntax, and the common idiomatic phrases. *Frazer and Squair's Grammar*. Reading three of the following: *La Tache du Petit Pierre, Mairet*; *Un Cas de Conscience, Gervais*; *La Main Malheureuse, Guerber*; *Sans Famille, Malot*; *Super's Readings from French History*.

[Five hours a week for two terms.]

B.

Advanced grammar and composition, study of idioms, memorizing. *Frazer and Squair's Grammar*. Dictations and conversations are added on practical topics and careful translation made of five of the following works: *Le Voyage de M. Perrichon*, Labiche; *Roman d'un Jeune Homme Pauvre*, Feuillet; *Fables choisies*, La Fontaine; *Le Médecin Malgré Lui*, Molière; *Le Cid*, Corneille; *Esther*, Racine; *Pages oubliées de Chateaubriand*; *La Question d'Argent*, Dumas; *Standard French Authors*, Guerlac.

[Five hours a week for two terms.]

C.

The study of this course is devoted chiefly to the prose and poetry of the nineteenth century and includes composition, conversation, history and general view of French literature. Besides a reading and criticism of the best writers, such as: *Causeries du Lundi*, Ste. Beuve; *On Rend l'Argent*, Coppée; *Hernani*, Hugo; *Méditations*, Lamartine; *Athalie*, Racine; *L'Avare*, Molière; *Mlle. de la Seglière*, Sandeau; *Les Origines de la France Contemporaine*, Taine; *Expédition de Bonaparte en Egypte*, Thier; *Ste. Elizabeth de Hongrie*, Montalembert; *Histoire de la Littérature Française*, Duval.

[Four hours a week for two terms.]

N. B.—The works studied are not necessarily the same every year.

GREEK

A.

First Greek Book. *White*.

EPITOME OF THE NEW TESTAMENT, *Stoffel*.

[Five hours a week for two terms.]

B.

Grammar. Etymology. *Hadley and Allen.*

XENOPHON. Anabasis, Books I. and II. *Harper and Wallace.*

SECOND GREEK EXERCISE BOOK. *Heard.*

ÉPITOME OF THE NEW TESTAMENT, continued. *Stoffel.*

[Five hours a week for two terms.]

C.

Grammar. Syntax. *Hadley and Allen.*

XENOPHON. Anabasis, Books III. and IV. *Harper and Wallace.*

SECOND GREEK EXERCISE BOOK, completed. *Heard.*

ÉPITOME OF THE NEW TESTAMENT, completed. *Stoffel.*

HOMER, *Iliad*, Books I.–VI. *Seymour.*

[Five hours a week for two terms.]

GERMAN

A.

Grammar, *Thomas.* Reading of simple prose, plays, poems; translation of English exercises into German. Reading of short stories and selections from more difficult prose.

German Reader, *Miller and Wenkelbach.*

[Five hours a week for two terms.]

B.

Grammar; *Thomas.* Translation into German of narrative prose and selections from history.

Herman and Dorothea, *Goethe*; Lichtenstein, *Hauff.*

[Five hours a week for two terms.]

C.

Grammar, *Thomas*. Sight reading of plays, poems, and prose writings. Translation of selections from history and literature; original essays.

Minna von Barnhelm, *Lessing*; best known poems, *Heine*; Correspondence, *Schiller-Goethe*.

[Four hours a week for two terms.]

HISTORY

A.

ANCIENT HISTORY. *Myers' Ancient History*. The Eastern Nations. The History of Greece and of the Empire of Alexander. The Story of Rome. The Establishment of the Empire, and the rise of Christianity. The Roman-German, or Transition Age.

[Five hours a week for one year.]

B.

MEDIEVAL HISTORY AND MODERN HISTORY. Text-book, *Myers*. The Barbarians and their Kingdoms. Mohammedanism and the Saracen Caliphs. The Holy Roman Empire. The Great Schism and the rise of the Nations of Modern Europe. The Renaissance. The Age of Discovery. The Protestant Reformation. The Power of Spain and Germany. The Age of Louis XVI., and the rise of Russia. The Spanish and Austrian Successions. The Empire of England. The American Revolution. The French Revolution and the Wars of Napoleon. The Revolutions and Spirit of Nationality. The Formation of Germany and Italy.

[Five hours a week for one year.]

C.

AMERICAN HISTORY. A brief outline of the more important periods dealing with the beginning, growth and final formation of the republic; the principal causes leading to this formation; essential topics in the history of the country.

[Five hours a week for one term.]

LATIN

A.

First Year Latin, *Collar and Daniel*.

Selections from the *Viri Romae*. *Rolfe*.

[Five hours a week for two terms.]

B.

Grammar. Etymology. *Bennett*.

Cæsar. Gallic War, Books I.–IV. *Greenough*.

Nepos. Selected Lives. *Roberts*. [Elective.]

Latin Composition (Part I.). *D'Ooge*.

[Five hours a week for two terms.]

C.

Grammar. Syntax, *Bennett*.

CICERO. Orations against Catiline. *Kelsey*.

OVID. Selections. *Kelsey*.

SALLUST. Cataline, *Nall*. [Elective.]

Latin Composition (Part II.). *D'Ooge*.

[Five hours a week for two terms.]

D.

Grammar. Review. *Bennett*.

CICERO. Selected Orations and Letters, *Kelsey*.

VERGIL. *Aeneid*, Books I.–VI., *Frieze*.

Latin Composition (Part III.). *D'Ooge*.

[Five hours a week for two terms.]

MATHEMATICS

A.

ALGEBRA. This course for beginners in Algebra includes a study of the primary fundamental principles necessary to the courses which follow. The subjects dwelt upon in particular are factoring, highest common factor and least common multiple, which are afterward applied in their relation to Fractions and the reduction of Complex Fractions. In as far as possible, concrete examples of their applications to kindred scientific subjects are applied by the teacher. Text-book, *Wentworth's School Algebra*.

[Five hours a week for one term.]

B.

ALGEBRA. In this course the study of equations is begun and continued through equations of the first degree. Fractional equations, systems of simultaneous equations, involutions, radicals and exponents complete the course, which is supplemented whenever possible with problems of practical application. Text-book, *Wentworth's School Algebra*.

[Five hours a week for one term.]

C.

ALGEBRA. This course begins with quadratic equations, pure and unaffected, followed by systems of simultaneous quadratic equations and those forms of radical equations of higher degree which may be solved by quadratic methods. Ratio and proportion, indeterminate equations, surds, imaginaries, inequalities, the progressions and the binomial theorem finish the work in this course. As in the preceding courses, special stress is placed upon the application of the theory to such examples as will show its ap-

plication to elementary scientific subjects. Text-book, *Wentworth's College Algebra*.

[Five hours a week for one term.]

D.

GEOMETRY. This subject is completed as far as the end of plane geometry and includes a study of the theorems with proofs of exercises and original propositions. The habit of independent thinking is cultivated to some extent by the solution of special problems of a concrete nature intended to exhibit the relation of the process studied to practical examples. Text-book, *Wentworth*.

[Five hours a week for two terms.]

E.

GEOMETRY. The study of solid geometry is taken up in this term, the course being an extension of that of the preceding course. Planes, solid angles, polyhedrons, the cylinder, cone and sphere are all studied in detail and the solution of original exercises and propositions of application is made a feature of the course. Text-book, *Wentworth*.

[Five hours a week for one term.]

F.

TRIGONOMETRY. A half year is given to this subject which includes both plane and spherical trigonometry. The work done is the equivalent of that in most of the elementary text-books. Special attention is given to goniometry on account of its application to calculus, and examples of a concrete nature are abundantly supplied. Text-book, *Wentworth*.

[Five hours a week for one term.]

SCIENCE

A.

PHYSICAL GEOGRAPHY. An introductory and elementary study of the earth and its environments. The student will be led into a closer sympathy with the world about him. The various types of plant and animal life, together with topographical and climatic conditions will be considered. Text-book, *Tarr*.

[Five hours a week for one term.]

B.

PHYSIOLOGY. Lectures, recitations and demonstrations with the stereopticon. The study of the human skeleton including the physiology and hygiene of the bones. The action, relation, structure and hygiene of muscles. The digestive, circulatory and excretory systems demonstrated by models and charts. The anatomy and structure of the nervous system and simple experiments on the same. Text-book, *Martin's Human Body*.

[Five hours a week for one term.]

C.

BOTANY. This course is designed for beginners in this subject; it includes a study of the higher plants with reference to structure of root, stem, leaf, flower and seed. An introduction to the lower forms of plant life and their classification is also given. Text-book, *Bastian's Elements of Botany*.

[Five hours a week for one term.]

D.

ZOOLOGY. This course includes an introduction to the subject with studies of representative forms and their classification in the different groups of the animal

kingdom. The subject is taught by recitations and laboratory work. Text-book, *Chapin and Rettger*.

[Five hours a week for one term.]

E.

(a) CHEMISTRY. An introductory course of experimental lectures on familiar subjects such as water, the air and its constituents, common salt, etc., leading up to discussions of the more important elements and their properties, and the fundamental laws and phenomena of chemistry. Text-book, *Maguire's Elements of Chemistry*.

[Three hours a week for one term.]

(b) EXPERIMENTAL CHEMISTRY. A Laboratory course to accompany Course (a). A series of exercises to be performed by each student, and having as their main object the cultivation of the student's powers of observation and faculty of inductive reasoning. These exercises comprise a study of the principal metallic elements, including their preparation, properties and more familiar compounds. The directions for each experiment are made as brief as possible; the observation of facts and the drawings of correct conclusions therefrom being left, so far as the nature of the experiment will permit, to the student.

[Two hours (four hours of actual work) each week for one year.]

F.

(a) PHYSICS. Introduction in elementary physics is given by lectures and recitations in which the general laws of mechanics, heat, acoustics, optics, electricity and magnetism are presented. The course is intended to meet the needs of those who desire a general knowledge of the subject, as well as to lay the foundation

for advanced work. Particular attention is paid to the correct statement of principles so that in his advanced work the student will have nothing to unlearn or relearn. Text-book, *Carhart and Chute*.

[Three hours a week for one year.]

(b) LABORATORY WORK of this nature consists of a series of 60 experiments which verify and apply practically the fundamental principles of physics. The student also receives instruction in the use and careful handling of apparatus, accurate observation, and correct deduction of results. Neat and concise reports of all experiments are kept by each student and form the basis for the grades in this work.

[Two hours (four hours of actual work) each week for one year.]

THE COMMERCIAL HIGH SCHOOL

The Commercial School is designed to fuse with the ordinary High School or preparatory program of studies, a special preparation for the processes of modern commercial life. Accordingly, the commercial program consists of a selection of the more important subjects in the High School curriculum to which are added the classes and experimental facilities found in a complete and up-to-date commercial college.

Owing to conditions specially favorable to study, Notre Dame claims to give the students of this school a more complete business training than can be obtained in any purely commercial college. The authorities require that students taking this program shall have completed two years of a regular High School or its equivalent. Special arrangements, however, will be made for young men who have no High School training, but who may have had practical business or office experience. Such students may follow the courses of this program of studies but will not be considered candidates for degrees. A certificate stating the field covered by their studies will, however, be presented to them. Graduates of High Schools or equivalent preparatory schools will ordinarily be able to complete the work of this program in *one year*.

COMMERCIAL PROGRAM*

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
English	5	A	English	5	A
Mathematics	5	A	Mathematics	5	B
History	5	A	History	5	A
German	5	A	German	5	A
Science	5	A	Science	5	B

SECOND YEAR

English	5	B	English	5	B
Mathematics	5	C	Civil Governm't	5	A
History	5	B	History	5	B
German	5	B	German	5	B
Science	5	E	Science	5	E

THIRD YEAR

English	5	C	English	5	C
Bookkeeping	5	A	Bookkeeping	5	A
Phonography	5	A	Phonography	5	A
Arithmetic	5	A	Arithmetic	5	B
Typewriting	5	A	Typewriting	5	A
Penmanship	2		Penmanship	2	

FOURTH YEAR

English	5	D	English	5	D
Bookkeeping	5	B	Bookkeeping	8	C
Phonography	5	B	Phonography	5	B
Com. Law	5	A	Commerce	5	A
Typewriting	3	B	Typewriting	3	A

* First and second year or equivalent required for entrance on commercial work.

Students who do not take Phonography will take up Plane Geometry the third year and Physics the fourth year.

PROGRAM OF INSTRUCTION

ARITHMETIC

A. PERCENTAGE; ratio and proportion, as far as involution and evolution.

B. PERCENTAGE, ratio and proportion (reviewed); involution and evolution; arithmetical and geometrical series; higher percentage; mensuration; arithmetical analysis.

BOOKKEEPING

A. Preparatory instruction and definitions; initiatory sets of Double Entry; retailing by Double Entry; special practice in writing business papers and business forms. Single Entry; changing Single to Double Entry.

B. RETAILING; wholesaling; shipping and commission; jobbing; manufacturing; instalment and state agencies; joint stock companies; banking.

C. BUSINESS PRACTICE AND OFFICE WORK. Introducing Loose Leaf Accounting, Card Ledger Accounting, Loose Leaf and Sales Book, and the Voucher System of Bookkeeping and Business English.

COMMERCIAL LAW

A. Text-book, *Huffcut's Elements of Business Laws*.

HISTORY OF COMMERCE

A. Text and assigned topics.

PENMANSHIP

PHONOGRAPHY

A. Isaac Pitman's Short Course in Phonography.

B. SPEED CLASS.

TYPEWRITING

- A. The Van Sant System of Touch Typewriting.
- B. SPEED CLASS. Mimeograph and Hektograph work.

GRAMMAR SCHOOL WORK

The courses of the Preparatory School outlined above are equivalent to those of a High School. There is also a Junior Preparatory Department in which are taught all the branches of a Grammar School,—the students having every opportunity for preparing themselves as rapidly as possible for High School work.

THE SCHOOL FOR MINIMS

For the care and training of boys under the age of thirteen years, there has been established a primary school to which the most scrupulous attention has always been paid by the authorities of the University—it is known as St. Edward's Hall.

Thorough and comprehensive instruction in all the elementary branches of an English education is here imparted, together with a rudimentary knowledge of Latin, French, German and Algebra. Vocal Music and Drawing involve no extra charge. The pupils of this department are taught by Sisters of the Holy Cross.

DISCIPLINE

The following is the order of the day: Rising at 6:30 a. m., toilet, etc., seven, breakfast, after which there is a short time given to exercise on the campus; eight, study; half-past nine, luncheon; ten, classes and study; a quarter to twelve, toilet; twelve, dinner, followed by recreation; half-past one, classes and study; three, recreation and luncheon; half-past four, classes and study; a quarter to six, toilet; six, supper and recreation; half-past eight, retiring. From this it may be seen that while the Minims devote almost seven hours a day to study, they are never more than two hours in succession in the class-room. The recreation and exercise in the fresh air after each period of study, unbend the mind and prepare the boys to return to their classes refreshed and ready to work.

The Minims are always under supervision during the hours of recreation as well as in the class-room

and the study-hall. The presence, however, of the prefect is far from being a restraint on the amusement of the boys; for while it is the duty of the prefects to insist that their young charges shall always keep within the limits of the strictest propriety, they at the same time take part in all sports, organize games, and do everything in their power to foster the love for exercise. The playground is a broad, level, eight-acre field, well supplied with turning poles, swings, ladders, rings, parallel bars, and all other necessary gymnastic apparatus. That the boys make good use of them can be seen from their healthy, happy appearance, which invariably attracts the notice of visitors. Connected with the playground is a brick play-hall, one-hundred and sixty feet long and heated by steam. In this hall the boys play in rainy or cold weather.

The Sisters preside at the toilet; they clean and mend the clothing; see to all the needs and to the comfort and convenience of the Minims. Baths are taken every few days. Underclothing is changed regularly. Great care is taken that the boys be neatly dressed, and that the clothing be suitable for the season.

SOCIETIES

There are two societies in the Minim Department, that of the Guardian Angels of the Sanctuary, which has for its object to supply servers for the Chapel services, and the Sorin Association, which has been established with a view to give the pupils a start, as early as possible, in elocution. The society is presided over by one of the professors, who finds it a pleasant duty to draw out the talent of these interesting young orators. Meetings are held once a week, after school hours. These meetings are a source of pleasure as well

as of profit. The members prepare original compositions, deliver declamations, are trained to debate, etc. Only the best behaved and more advanced in studies are admitted to membership. To encourage this young literary society, a gold medal for elocution is annually awarded at Commencement to the most deserving member.

GENERAL REMARKS

The discipline to which the Minims are subjected is much milder than that which is suited to members more advanced in age. Recourse is scarcely ever had to punishment. Those in charge endeavor to govern by kindness and gentleness, and by appealing to the boys' sense of honor.

There are gold medals awarded at the end of two full years to those whose deportment has been unexceptionable during that period. As this fact is made known to the Minim immediately after his entrance, he generally endeavors to shape his conduct with a view to receiving an Honor. The greatest care is taken to form their young hearts to habits of virtue, and to inculcate the practice of refined manners. Every effort is made to foster respect and affection for parents, to whom they are expected to write at least once a week.

Not the least of the advantages enjoyed by the Minims is their complete separation from the older students. A commodious building, known as St. Edward's Hall, affording ample accommodations for over one hundred pupils, is devoted to their use. It is four stories in height, one-hundred and fifty feet long, and forty-five feet wide, heated by steam, supplied throughout with electric light, and provided with hot and cold water. The ceiling in the study-hall, classrooms and sleeping apartments is fifteen feet high. The

windows are large and numerous, affording abundant light and ventilation. The study-hall commands a charming view from each end of its eleven large windows. It is tastefully decorated with statuary, pictures, plants, etc. Besides the pleasure the Minims derive from studying in this bright, cheerful hall, their tastes are cultured by coming into contact with objects so refining. Fronting the building is a handsome park, which, with its fountains, rare trees and flowers, adds not a little to the beauty of St. Edward's Hall, as well as to the happiness of its pupils.

These remarks, which have been made to satisfy parents and others who frequently write for more detailed information, will show that, while the Minims have every advantage to aid them in acquiring a foundation for future study, they have a home, where they enjoy the same ease and freedom that they would enjoy under the care of their mothers. For further information regarding the School for Minims apply for a special catalogue.

EXPENSES

[For Students under Thirteen Years of Age.]

Matriculation Fee (first year only).....	\$ 10.00
Tuition, Board, Washing, Mending, Bed and Bedding, etc., per school year.....	250.00
Payable in advance as follows:	

First Payment,—On Entrance in September.

Matriculation Fee.....	10.00
Board and Tuition.....	150.00
Deposit on Book and Stationery Account.....	5.00
Gymnasium.....	2.50
Lecture and Concert Course Ticket.....	1.00
Music optional. For rates see below.	

Second Payment,—On January 15.

Balance on Board and Tuition.....	\$100.00
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The charge for lessons on piano, violin, guitar or mandolin, and the use of the instrument, is fixed at \$50.

Accounts are subject to sight draft, without notice, if not paid within ten days after they have been rendered.

Each pupil requires six shirts or waists, four suits of underwear, three night shirts, twelve pocket handkerchiefs, six pairs of stockings, six towels, two hats or caps, two pair of shoes, a pair of overshoes, three suits of clothes, an overcoat, toilet set, blacking brush, soap, and a hand mirror. This direction concerning clothing is a suggestion, not a regulation. Any of the above supplies can be procured through the Students' Office at the University.

MILITARY

During the summer vacation of 1910 the Secretary of War appointed a retired officer of the United States Army, Professor of Military Science and Tactics in the University of Notre Dame.

The Military drill has for some years been compulsory in St. Edward's Hall and in Carroll Hall. In the other departments this exercise has been altogether voluntary. It has proved popular hitherto with the older students; and Corby, Walsh and Brownson each furnished a strong company to the battalion last year. The value of the military drill was instantly recognized and the success that attended the work was extremely gratifying.

This year it has been made compulsory three hours a week for all students except Seniors and Juniors in the college courses. Other students seeking exemption from the drill must make application to the President. It is accredited as a class, and absence from it is regarded as absence from class, involving the usual demerits and other penalties.

The cost of a uniform with military negligee shirt for warm weather is about fifteen dollars. Other military equipment is furnished by the United States Government.

The officers of the battalion for the past year were as follows:

CAPTAIN R. R. STOGSDALL, U. S. A., Retired,
Professor of Military Science and Tactics.

COLOR SERGEANT HERMAN HERING, U. S. A., Retired,
Assistant Military Instructor.

STAFF.

LEO JAMES CONDON,
First Lieutenant and Adjutant.

JOHN WILLIAM COSTELLO,
First Lieutenant and Quartermaster.

FRANCIS BERNARD MCBRIDE,
First Lieutenant and Commissary.

CARMO FRANCIS DIXON,
First Lieutenant and Signal Officer.

COMPANY B.

JAMES DANIEL NOLAN,
Captain.

JOHN ALFRED SAWKINS,
First Lieutenant.

FREDERIC MATTHEW GILBOUGH,
Second Lieutenant.

COMPANY C.

PAUL AUGUST ROTHWELL,
Captain.

JAMES WARREN BURKE,
First Lieutenant.

WILLIAM EDWARD MCMORRAN,
Second Lieutenant.

COMPANY D.

LEO FRANCIS GARRITY,
Captain.

THOMAS ALOYSIUS DOCKWEILER,
First Lieutenant.

WALTER JOHN MAGUIRE,
Second Lieutenant.

CARROLL HALL.

FABIAN NEELE JOHNSTON,
Captain.

ALBERT HEUSER KEYS,
First Lieutenant.

LEO ALBERT SCHUMACHER,
Second Lieutenant.

LIST OF STUDENTS

LIST OF STUDENTS

Matriculated During the Scholastic Year 1911-1912

Amondarain, Ignacio Antonio.....	Argentine, South America
Ansberry, Edward.....	Canal Zone
- Arias, Manuel Fernando.....	Cuba
Arnfield, Fremont.....	Illinois
Anderson, Raymond Thomas.....	Illinois
Aube, James Foster.....	Illinois
Anderson, Barrett John.....	Illinois
Armstrong, Lennox Francois.....	Illinois
Abshire, Dawson A.....	Indiana
Anthony, B.....	Indiana
Aud, Hugh Paul.....	Kentucky
Andrew, B.....	Massachusetts
Aldrete, Antonio, Jr.....	Mexico
Alvarez, Domingo.....	Mexico
Ayala, Antonio Lorenzo.....	Mexico
Anchondo, Manuel Eduardo.....	Mexico
Adams, George Edward.....	Michigan
Augustin, Antony.....	Michigan
Allen, Henry Harding.....	Michigan
Anderson, Frank Albert.....	Ohio
Adolphus, B.....	Wisconsin
Austin, B.....	Wisconsin
Adriansen, Joseph Willebrod.....	Wisconsin
Baldwin, Warren.....	Arkansas
Brizzolara, Aristo Cornelius.....	Arkansas
Barrozo, Guemercindo C. d'O.....	Brazil, South America
Breslin, Frank Jerome.....	California
Blake, Edward Francis.....	Connecticut
Bernet, Wm. Gerard.....	Illinois
- Burke, Thomas Joseph.....	Illinois
Burns, Russell Joseph.....	Illinois
Blackburn, Wm. John.....	Illinois
Bernoudy, Alfred Charles.....	Illinois

Bowles, John Hense.....	Illinois
Barry, George Francis.....	Illinois
Bergfeld, Elliott Wm.....	Illinois
Boldt, Herbert August.....	Illinois
Blackman, Everett Augustus.....	Illinois
Barry, Norman Stephen.....	Illinois
Burt, Millard Cyril.....	Illinois
Birkenbuel, Walter Edgar.....	Illinois
Burke, William Joseph.....	Illinois
Burke, Thomas Edward.....	Illinois
Biadaszkiewicz, Louis.....	Illinois
Biadaszkiewicz, John.....	Illinois
Baujan, Harry Clifford.....	Illinois
Burns, Stephen Emmett.....	Indiana
Boyle, Francis Thomas.....	Indiana
Bergman, Alfred Arthur.....	Indiana
Bergman, Arthur Joseph.....	Indiana
Berger, Alvin.....	Indiana
Brentlinger, Byron Wm.....	Indiana
Berner, Leo Sebastian.....	Indiana
Buckley, Bernard.....	Indiana
Burke, Wm. Ignatius.....	Indiana
Burke, Edmund Thomas.....	Iowa
Barth, John Henry.....	Iowa
Buskirk, Randolph Joseph.....	Kentucky
Becker, Michael Stanley.....	Louisiana
Bracho, Jose.....	Mexico
Bracho, Jose Fernando.....	Mexico
Becht, Lincoln Edward.....	Michigan
Bednarek, Felix.....	Michigan
Bozek, Joseph.....	Michigan
Boucher, Fred Joseph.....	Michigan
Boos, Frank Holgate.....	Michigan
Burns, John Thomas.....	Michigan
Boland, James Isidore.....	Michigan
Brown, Francis Aloysius.....	Michigan
Brooke, Francis Ambrose.....	Michigan
Barrett, Edward Francis.....	Minnesota
Barrett, Lawrence James.....	Minnesota
Bartel, Frank Octave.....	Minnesota
Barrett, David Moses.....	Minnesota
Bollin, Walter Scott.....	Missouri

Bensberg, Wm. Joseph.....	Missouri
Bruce, Edward Miles.....	Missouri
Brookfield, Edward V.....	Missouri
Brannan, Sylvester Anthony.....	Nebraska
Byrne, Joseph Michael, Jr.....	New Jersey
Baca, Anastasio C. de.....	New Mexico
Bible, Robert Gogen.....	New Mexico
Bogy, Bernard Pratte, Jr.....	New York
Byrne, Paul Ryan.....	New York
Barclay, Francis Arthur.....	New York
Brennan, Raymond Patrick.....	New York
Birder, Jacob Vivian.....	North Dakota
Birder, Cecil Edward.....	North Dakota
Beckham, Wm. Lemert.....	Ohio
Brucker, Edward Francis.....	Ohio
Baader, Ernest John.....	Ohio
Burger, Alfred Andrew.....	Ohio
Bnrkhard, Sylvester Jerome.....	Ohio
Boyle, John Francis.....	Oklahoma
Brown, Alfred John.....	Oregon
Bartholomew, Norman Cletus.....	Pennsylvania
Bannon, John Mackin.....	Pennsylvania
Burns, Edward Clark.....	Rhode Island
Broussard, Clyde Eloi.....	Texas
Barry, Patrick Arthur.....	Vermont
Buskirk, Russell Clay.....	West Virginia
Basil, B.....	Wisconsin
Burke, James Warren.....	Wisconsin
Brooks, Christopher Francis.....	Wisconsin
Canning, Francis Roche.....	California
Curry, James Augustus.....	Connecticut
Curry, Thomas Benedict.....	Connecticut
Curry, Edward Paul.....	Connecticut
Cortes, Felipe Victor.....	Chili, South America
Cortes, Scipion Felipè.....	Chili, South America
Clark, Sheldon Adelbert.....	Illinois
Casey, Gerard Henry.....	Illinois
Cotter, Wm. Edward.....	Illinois
Clark, Harry A. S.....	Illinois
Clancy, Byron.....	Illinois
Cleary, Edward Patrick.....	Illinois

Carey, Edmund Aloysius.....	Illinois
Carey, Eugene Thomas.....	Illinois
Connolley, Robert Emmet.....	Illinois
Coakley, Wm. Edward.....	Illinois
Conover, Chas. Sydney.....	Illinois
Clarke, George Walker.....	Illinois
Clarke, Francis Thomas.....	Illinois
Condon, Leo James.....	Illinois
Cooney, Earl Thomas.....	Illinois
Case, Wm. Denning.....	Illinois
Countiss, Fred N.....	Illinois
Collins, Thomas Daniel.....	Illinois
Cahill, James Francis.....	Illinois
Callahan, Edward Timothy.....	Illinois
Costello, John William.....	Indiana
Canty, Wm. Sumner.....	Indiana
Clifford, Twomey Michael.....	Indiana
Cox, Benjamin Joseph.....	Indiana
Coffeen, Walter Henry.....	Indiana
Czarnecki, Edmund.....	Indiana
Chester, Willard Harry.....	Indiana
Clark, Henry G.....	Indiana
Cusack, Wm. John.....	Iowa
Colby, Colburn Joseph.....	Iowa
Carey, Charles Maurice.....	Kansas
Carey, Joseph Thomas.....	Kansas
Craven, Thomas Vincent.....	Louisiana
Carmody, Arthur Roderick.....	Louisiana
Carmody, Francis Michael.....	Louisiana
Cox, Louis Charles.....	Manitoba, Canada
Callery, Philip Joseph.....	Massachusetts
Crowley, Chas. Francis.....	Massachusetts
Cortazar, Enrique.....	Mexico
Chavez, Jorge.....	Mexico
Ciprian, Joseph Edward.....	Michigan
Cullen, Harry Walter.....	Michigan
Cannon, Harold Clement.....	Michigan
Currie, Clarence Joseph.....	Michigan
Coyle, Matthew Aloysius.....	Michigan
Creamer, Patrick David.....	Minnesota
Campbell, Francis Bartley.....	Montana
Christopher, B.....	New York

Cyczarnski, Henry.....	New York
Curran, Cyril Joseph.....	New York
Cagney, John Stuart.....	Ohio
Clay, Amos Kendall, Jr.....	Ohio
Cusick, Dwight Paul.....	Ohio
Cavanaugh, Frank Remigius.....	Ohio
Coxey, Jacob Sechler.....	Ohio
Corcoran, William Joseph.....	Oregon
Conway, Maurice A.....	Oregon
Cunning, Patrick Henry.....	Pennsylvania
Cowan, Charles Thomas.....	Pennsylvania
Connors, John Michael.....	Pennsylvania
Corasao, Alberto.....	Peru, South America
Corbato, Hermenegildo, O. P.....	Spain
Casey, Wm. Christopher.....	Tennessee
Coker, Wallace Earl.....	Texas
Cleaver, Wm. Edward.....	Washington
Cline, Otis Ray.....	West Virginia
Coughlin, Robert Jerry.....	Wisconsin
Cremer, Glynn Francis.....	Wisconsin
Carroll, John Francis.....	Wisconsin
Clifford, Myron James.....	Wisconsin
Dunn, John Gordon.....	Alabama
Dockweiler, Thomas A. J.....	California
Dockweiler, Henry Isidore.....	California
Donovan, Herbert Dennis.....	Colorado
Devine, John Francis, Jr.....	Illinois
Delana, George William.....	Illinois
Daly, Hugh James.....	Illinois
Donahue, Francis.....	Illinois
Dixon, Paul Goodrich.....	Illinois
Dorsey, John Stuart.....	Illinois
Downing, Wm. Poyntelle.....	Illinois
Duncan, Walter.....	Illinois
Doherty, Patrick Henry.....	Illinois
Dee, Samuel Allerton.....	Illinois
Duffin, Leon Gavin.....	Illinois
Dolan, Patrick Henry.....	Illinois
Brechney, John Harry.....	Illinois
Donohue, William Matthew.....	Indiana
Duggan, Edward Deane.....	Indiana

Douglas, Joseph Arthur.....	Indiana
Dinnen, George Alyosius.....	Indiana
Dinnen, John Richard.....	Indiana
Dinnen, Robert Augustine.....	Indiana
Damian, B.....	Indiana
De Fries, Erich Hans.....	Iowa
Daily, John Frederick.....	Kansas
Dunphy, Wm. Francis.....	Massachusetts
Davila, Francisco Paula.....	Mexico
De la Cruz, Jose.....	Mexico
Durand, Carlos.....	Mexico
Dundon, John Richard.....	Michigan
Daly, James Stewart.....	Michigan
Dodge, John Duval.....	Michigan
Dancer, Louis James.....	Michigan
Dohn, Bernard Chas.....	Michigan
Dolan, Wm. Thomas.....	Missouri
Downey, Timothy Edward.....	Montana
Dixon, Carmo Francis.....	Ohio
Durbin, Francis William.....	Ohio
Devitt, James Ryan.....	Ohio
Daugherty, Michael A. Jr.....	Ohio
Drushl, Carl Anthony.....	Ohio
Donly, Hugh Perry Jr.....	Oklahoma
Dew, Jesse Edward.....	Oklahoma
Dyer, Edwin Ruthwin.....	Oklahoma
Dew, Edward Livingston.....	Oklahoma
Daly, William Orvin.....	Oregon
Duque, Carlos Alphonsus.....	Peru, South America
Damiana, Carlos Reinaldo.....	Peru, South America
Devlin, James Sylvester.....	Pennsylvania
Denny, John Bert, Jr.....	Pennsylvania
Derrick, Clarence Joseph.....	Pennsylvania
Daly, Robert Emmett.....	Pennsylvania
Dougherty, Clement Francis.....	Wisconsin
Dorais, Charles Emille.....	Wisconsin
Doyle, Wm. Ester.....	Wisconsin
Diener, Charles Norman.....	Wisconsin
Durch, Bernard Jacob.....	Wisconsin
Desmond, John Wm.....	Wisconsin
Desmond, James Dennis.....	Wisconsin

Espinal, Antonio Marino.....	Cuba
Emiliani, Simon Joseph.....	Colombia, South America
Ecklund, Percy August.....	Illinois
Egan, Bernard Aloysius.....	Illinois
Edward, B.....	Illinois
Edmund, B.....	Illinois
Eugene, B.....	Illinois
Ericson, Fred.....	Illinois
Eggert, Carl Ernest.....	Indiana
Elward, Allen Henry.....	Massachusetts
Eichenlaub, Raymond Joseph.....	Ohio
Eick, Louis Ferdinand.....	Ohio
Eck, Vincent John.....	Pennsylvania
Ely, Charles Stuart.....	Pennsylvania
Enaje, Francisco Delgado.....	Philippine Islands
Emerson, Joseph George.....	Texas
Farry, Claude Joseph.....	Colorado
Ffrench, Jasper Joseph.....	Illinois
Fritch, Louis Michael.....	Illinois
Fortier, Edward Emmett.....	Illinois
Fahy, Murty Michael.....	Illinois
Fowler, Aelred.....	Illinois
Fellers, Brooks.....	Illinois
Furlong, Thomas Aloysius.....	Illinois
Farrell, Simon Thomas.....	Illinois
Figel, Theodore Aloysius.....	Illinois
Fecher, Martin Walter.....	Illinois
Fritch, Emil Joseph.....	Illinois
Fumasoli, Ernest.....	Illinois
Felix, B.....	Illinois
Fletcher, Forest.....	Illinois
Fischer, Robert.....	Illinois
Feeney, Albert George.....	Indiana
Fox, Wm. Francis, Jr.....	Indiana
Friedman, John Henry.....	Indiana
Freeman, Lawrence Arthur.....	Indiana
Finegan, Charles Thomas.....	Idaho
Finnegan, Frank Roman.....	Kansas
Fanelli, Salvatore Paul.....	Kentucky
Florence, B.....	Michigan
Fries, Alfred Francis.....	Michigan

Finn, Russell Gregory.....	Michigan
Funk, Michael.....	Michigan
Fish, William Arthur.....	Massachusetts
Fant, Paul Douglas.....	Missouri
Farrell, Joseph Richard.....	New York
Flannagan, Simeon Thomas.....	New York
Fiedler, Eugene.....	New York
Flynn, Charles Joseph.....	Massachusetts
Fabian, B.....	Ohio
Fortune, Frank Guy.....	Ohio
Finneran, Francis Xavier.....	Ohio
Fletcher, Emmett Brooks.....	Ohio
Fasenmyer, Edward John.....	Pennsylvania
Fenesy, James Clair.....	Pennsylvania
Feyder, Theodore.....	South Dakota
Frawley, Henry James.....	South Dakota
Frawley, Wm. Gardner.....	South Dakota
Foote, John Orley.....	South Dakota
Fernandez, Candido, O. P.....	Spain
Fernandez, Manuel, O. P.....	Spain
Fordyce, John Martin.....	Wisconsin
Gonzalez, Jose Mario.....	Cuba
Gonzalez, Francisco Santiago.....	Cuba
Gonzalez, Manuel.....	Cuba
Gamboa, Octavio Francisco.....	Cuba
Garrity, Leo Francis.....	Illinois
Getschow, Roy Martin.....	Illinois
Gibbons, Walter Clark.....	Illinois
Gowen, Guy Howard.....	Illinois
Good, Ralph Edwin.....	Illinois
Green, Francis Edward.....	Indiana
Gross, Edward Walter.....	Indiana
Graczol, John, Jr.....	Indiana
Grover, Edward Hoyt.....	Indiana
Gossard, Everett Fleet.....	Indiana
Gough, Ruben St. Clair.....	Indiana
Glynn, Thomas David, Jr.....	Indiana
Glueckert, Henry George.....	Indiana
Granfield, William Joseph.....	Massachusetts
Gonzalez, Juan Garcia.....	Mexico
Gurza, Miguel Angel.....	Mexico

Guizar, Manuel, Jr.....	Mexico
Gutierrez, Rafael Diez.....	Mexico
Gregory, Charles Bernard.....	Michigan
Gray, Wilbur Theodore.....	Michigan
Gotfredson, Robert Benjamin.....	Michigan
Gaupel, Roland Joseph.....	Missouri
Garvey, Woolsey Robert.....	New Jersey
Gaines, Thos. Ray.....	New York
Guppy, Raymond Leslie.....	New York
Green, Allen Ransom.....	New York
Gloeckner, Albert Anthony.....	Ohio
Gfell, Vernon Edward.....	Ohio
Gendron, Leon Peter.....	Ohio
Gerber, Clement Joseph.....	Ohio
Geifer, Jacob Raphael.....	Ohio
Gillies, Frank Leslie.....	Ontario, Canada
Gunster, Joseph Fredrich.....	Pennsylvania
Gonzalez, Carlos Amador.....	Peru, South America
Gushurst, Ferd Wm.....	South Dakota
Gushurst, Edward.....	South Dakota
Guerra, Benajmin.....	Spain
Gilbough, Fred Matthew, Jr.....	Texas
Gleim, Fidelis Augustus.....	Texas
Galvin, Wm. Michael.....	Texas
Gannon, Thomas Edward.....	Wisconsin
Hebert, Walter Jones.....	Arkansas
Hebert, Gaston Arthur.....	Arkansas
Hood, John Leo.....	Idaho
Herr, Jesse James.....	Illinois
Hanlon, George Thomas, Jr.....	Illinois
Hecht, Arthur William.....	Illinois
Hayes, Frank Harold.....	Illinois
Healy, Joseph Jeremiah.....	Illinois
Hurley, Ira Wm.....	Illinois
Hicks, Wm. Joseph.....	Illinois
Hassett, Frank Aloysius.....	Illinois
Hartman, Karl.....	Illinois
Hamler, Jerome Peter.....	Illinois
Honor, Walter Joseph.....	Illinois
Hawley, Edgar Joseph.....	Illinois
Hawley, John Wm.....	Illinois

Hews, Edson Lawrence.....	Illinois
Hews, Auber Nestor.....	Illinois
Huszagh, Lyman Thomas.....	Illinois
Haggerty, Richard.....	Illinois
Haggerty, John Michael.....	Illinois
Hilgartner, Daniel Edward.....	Illinois
Hanrahan, Francis J.....	Illinois
Hogan, Francis Michael.....	Indiana
Hazinski, Ladislaus Leo.....	Indiana
Hennessy, James.....	Indiana
Holden, John Shedd.....	Indiana
Hagerty, Chas. Aloysius.....	Indiana
Hagerty, Michael Victor.....	Indiana
Hillman, Victor Emmanuel.....	Indiana
Hiss, Frank Joseph.....	Indiana
Hintz, Wm. Gustav.....	Indiana
Henneberger, Chas. Bernard.....	Indiana
Hayes, Cornelius Byron.....	Indiana
Hogan, James Edward.....	Indiana
Hazinski, Leo Casimir.....	Indiana
Heiser, Joseph Allan.....	Indiana
Holderith, George Leo.....	Indiana
Hynes, John Felix.....	Iowa
Healy, Thomas Moritz.....	Iowa
Healy, Kerndt Michael.....	Iowa
Horn, Tyree Rivers.....	Kansas
Huerkamp, Frederick John.....	Kentucky
Huerkamp, Joseph Martin.....	Kentucky
Henkel, Gustavo Antonio.....	Mexico
Henkel, Antonio Daniel.....	Mexico
Hafey, Frank William.....	Massachusetts
Haggerty, Jeremiah Joseph.....	Massachusetts
Healy, Wm. Andrew.....	Michigan
Healy, Harold James.....	Michigan
Haller, George Dewey.....	Michigan
Horton, James.....	Michigan
Hammond, LeGrande Anderson.....	Michigan
Hayes, Arthur Joseph.....	Minnesota
Hatten, Alvin Donald, Jr.....	Missouri
Harper, Albert Burgess.....	Missouri
Harvat, Paul Julius.....	Montana
Harvat, Edwin Joseph.....	Montana

Hebner, Harry Joseph.....	Nebraska
Hubbell, Charles Lawrence.....	New Mexico
Hubbell, Frank Alarico.....	New Mexico
Hubbell, Roman Guttierrez.....	New Mexico
Hickey, Cornelius Joseph.....	New York
Hickey, Eugene Thomas.....	New York
Hogan, Edward Francis.....	New York
Halter, Michael Valentine.....	Ohio
Hamilton, Donald Munson.....	Ohio
Hendricks, Charles Bernard.....	Ohio
Henehan, Martin Ignatius.....	Ohio
Hahne, Chas. Forster.....	Ohio
Herbert, Alfred Joseph.....	Pennsylvania
Heyl, Martin Joseph.....	Pennsylvania
Hogan, William Neil.....	Pennsylvania
Hernandez, Vincente.....	Porto Rico
Hearn, John Joseph.....	Quebec, Canada
Hanon, Otto Sylvester.....	South Dakota
Henry, John Wm.....	Texas
Howard, Edward Joseph.....	Vermont
Hallam, Willard Van Dake.....	West Virginia
Hamilton, Garland Buskirk.....	West Virginia
Hoffman, Eugene Frederick.....	West Virginia
Isidore, B.....	Wisconsin
Hayes, James Raymond.....	Wisconsin
Hayden, Wm. Basil.....	Wisconsin
Jones, Joseph Charles.....	Illinois
Joy, Joseph Francis.....	Illinois
Johnston, Philip Fenton.....	Illinois
Jakubowski, Ceslaus Joseph.....	Illinois
Janowski, Bronislaus J.....	Indiana
Johnson, Leroy Charles.....	Indiana
Jacobs, Walter Byron.....	Louisiana
Jacobs, Edward.....	Louisiana
Jones, Harry Bernard.....	Michigan
Jones, Keith Kenneth.....	Montana
Jones, Roy Henry.....	New Mexico
Jones, James Bernard.....	Pennsylvania
Johnston, Fabian Neele.....	Philippine Islands
Joyce, Howard Francis.....	Wisconsin

Kelly, Herbert Barrett.....	Alabama
Kretschmer, Alfred Arnold.....	Colorado
Krampff, Arthur Clyde.....	Illinois
Kasper, Alexander Michael.....	Illinois
Kelly, James Joseph.....	Illinois
Kalish, Wm. Jacob.....	Illinois
Kolb, Wm. Marcus.....	Illinois
Kolb, Bernard.....	Illinois
Klopfer, Henry D.....	Illinois
Krajezski, Casimir Ignatius.....	Illinois
Kelley, Pearce Clement.....	Illinois
Kasper, Simeon Michael.....	Illinois
King, Albert Vincent.....	Illinois
Kroll, John Joseph.....	Illinois
Kusznski, Stanislaus Stephen.....	Illinois
Kobrzynski, Joseph Stanislaus.....	Illinois
Kelley, John Charles.....	Indiana
Kaiser, Benedict Joseph.....	Indiana
Kolupa, Albin Stanislaus.....	Indiana
Kowalski, Sygfryd T.....	Indiana
Kowalski, Edmund Chas.....	Indiana
Keeslar, L. D.....	Indiana
Kruyer, Cletus Hugh.....	Indiana
Kennedy, Wm. Edward.....	Indiana
Kelly, Gordon Mark.....	Indiana
Krack, George Camille.....	Indiana
Kenney, Joseph Francis.....	Massachusetts
Kelly, Luke Leo.....	Massachusetts
Kinney, Maurice Henry.....	Michigan
Kirchman, Francis John.....	Nebraska
Kiley, Louis John.....	New York
Kiley, Frank Charles.....	New York
Kelly, Joseph Patrick.....	New York
Kirk, Harry John.....	Ohio
Krebs, Arnold Tobias.....	Ohio
Keys, Arthur Aloysius.....	Oklahoma
Keys, Albert Heuser.....	Oklahoma
Krug, Henry Carl.....	Ontario, Canada
Kelleher, Wm. Andrew.....	Oregon
Kane, Eugene Aloysius.....	Pennsylvania
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Kuhle, Albert Anton.....	South Dakota

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SIXTY-SEVENTH ANNUAL COMMENCEMENT

JUNE, 1911

CONFERRING OF DEGREES

THE DEGREE OF DOCTOR OF SCIENCE IN COURSE was conferred on:

James Joseph Walsh of New York City.

*THESIS: "The Popes and Science."

THE DEGREE OF DOCTOR OF LAWS was conferred:

On a distinguished jurist whose brilliance in the pleading of causes has been equalled only by his erudition and justice upon the bench, and whose administration of large enterprises has been surpassed only by the wisdom with which he has guided the destinies of a great sovereign State,

The Honorable Judson Harmon, Governor
of the State of Ohio.

On a distinguished son of Notre Dame whose priestly virtue is equalled only by the modesty which veils it from the public eye; a missionary who has contributed to the work of the Church in America its greatest and most original idea, the giving of missions for those outside the fold; an eloquent orator, a father of the spiritual life, a great patriot and a great priest,

Walter Elliott of the Paulist Community,
New York City.

On another son of Notre Dame, the founder of a great newspaper, an exponent of the cleanest and most wholesome as well as the most enterprising journalism; a defender of every good cause; a patron of art and a leader of his people,

William Rockhill Nelson, editor of the
Kansas City Star.

On an illustrious lawyer and statesman whose work in the Hague Peace Tribunal has won him the gratitude as well as the admiration of the world; whose constructive statesmanship has redounded to the glory of his country as his legal learning has added prestige to her highest Court of justice,

The Right Honorable Sir Charles Fitzpatrick,
Chief Justice and Deputy Governor of the
Dominion of Canada.

The Degree of Master of Science was conferred on:

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The degree of Master of Science in Chemistry was conferred on:

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Nicholas August Gamboa, Cienfuegos, Cuba.

Anton Raymond Hebenstreit, Shullsburg, Wisconsin.

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Rafael Garcia, Puebla, Mexico.

William John Heyl, Pittsburg, Pennsylvania.

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The degree of Engineer of Mines was conferred on:

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Ralph Chester Dimmick, Hubbard, Oregon.

Robert John Dederich, Saginaw, Michigan.

Joseph Thomas Dixon, Connellsville, Pennsylvania.

James Edward Deery, Indianapolis, Indiana.

J. Wilfred Ely, Jeanette, Pennsylvania.

Daniel Rolf Foley, Deerfield, Michigan.

Thomas Hugh Ford, Dayton, Ohio.

Edward L. Figel, Chicago, Illinois.

James Leo Hope, De Kalb, Illinois.

Albert Michael Kelly, Morris, Illinois.

Joseph Benedict Murphy, Dayton, Ohio.

Justin James Molony, Crawfordsville, Indiana.
Joseph John Maroney, Red Creek, New York.
Wilmer Leo O'Brien, Elkhart, Indiana.
James Baldwin O'Flynn, Butte, Montana.
William Richard Ryan, Cleveland, Ohio.
Arthur Anthony Schellinger, Mishawaka, Indiana.
Fred Llewellyn Steers, Chicago, Illinois.
Clement L. Ulatowski, Chicago, Illinois.
John Wesley Welch, Mishawaka, Indiana.

The degree of Pharmaceutical Chemist was conferred on:

Leon Francis Barbazette, Terre Haute, Indiana.
Fred Charles Dana, Fond du Lac, Wisconsin.
Otto Sylvester Hanon, Langford, South Dakota.
Henry Charles Moritz, Peoria, Illinois.
Fred George Wirthman, Kansas City, Missouri.

The degree of Graduate in Pharmacy was conferred on:

Edward Joseph Story, Elk City, Oklahoma.
Michael Francis Somers, Bloomington, Illinois.

Certificates for the Short Program in Electrical Engineering were conferred on:

John Proctor Dant, Louisville, Kentucky.
Philip Louis Fleck, Tiffin, Ohio.
Jose M. Mendoza, Chihuahua, Mexico.
James Joseph McCaffrey, South Bend, Indiana.
Carole Joseph Schmidt, Tiffin, Ohio.
Vaughan Henry Talcott, Louisville, Kentucky.

Certificates for the Short Program in Mechanical Engineering were conferred on:

Forest Clay Hyten, Ladoga, Indiana.
Julius Meuninck, Mishawaka, Indiana.
Lawrence Philip Schubert, Indiana.

Certificate for the Short Program in Architecture was conferred on:

Dalton Bacon Shourds, Terre Haute, Indiana.

PRIZE MEDALS

THE QUAN GOLD MEDAL, presented by the late William J. Quan, of Chicago, for the student having the best record in the Classical Program, Senior Year, and a money prize of twenty-five dollars, gift of Mr. Henry Quan, in memory of his deceased father, was awarded to

Joseph Andrew Quinlan, Chicago, Illinois.

THE MEEHAN GOLD MEDAL for English Essays, presented by Mrs. Eleanor Meehan, Covington, Kentucky, was awarded to

Thomas Aquinas Lahey, Michigan City, Indiana.

THE MARTIN J. MCCUE GOLD MEDAL, presented by Mr. Warren A. Cartier, Civil Engineer, of the class of '77, for the best record for four years in the Civil Engineering Program, was awarded to

Nicholas August Gamboa, Cienfuegos, Cuba.

THE BREEN GOLD MEDAL FOR ORATORY, presented by the Hon. William P. Breen, of the class of '77', was awarded to

Charles Christopher Miltner, Lake City, Minnesota.

THE BARRY ELOCUTION GOLD MEDAL, presented by the Hon. P. T. Barry, of Chicago, was awarded to Patrick Henry Cunning, Pittsburgh, Pennsylvania.

SEVENTY-FIVE DOLLARS for Debating work, was awarded as follows:

Thirty Dollars to

William Joseph Milroy, Chatsworth, Illinois.

Twenty-five Dollars to

John Thomas Burns, Kalamazoo, Michigan.

Twenty Dollars to

James Leo Hope, De Kalb, Illinois.

TEN DOLLARS IN GOLD for Junior Oratory, presented by Mr. James V. O'Donnell, of the class of '89, was awarded to

William Joseph Parish, Momence, Illinois.

TEN DOLLARS IN GOLD for Sophomore Oratory, presented by Mr. John S. Hummer, of the class of '91, was awarded to

William Joseph Milroy, Chatsworth, Illinois.

TEN DOLLARS IN GOLD for Freshman Oratory, presented by Mr. Hugh O'Neill, of the class of '91, was awarded to

Alfred John Brown, Portland, Oregon.

PREPARATORY SCHOOL

THE FITZSIMMONS GOLD MEDAL FOR CHRISTIAN DOCTRINE, presented by the Rev. W. J. Fitzsimmons, Chicago, was awarded to

Jorge San Pedro, Consolacion del Sur, Cuba.

THE O'BRIEN GOLD MEDAL for the best record in Preparatory Latin, the gift of the Rev. Terence A. O'Brien, of Chicago, was awarded to

John J. Margraf, Notre Dame, Indiana.

THE JOSEPH A. LYONS GOLD MEDAL FOR ELOCUTION was awarded to

Patrick Henry Dolan, Springfield, Illinois.

TEN DOLLARS IN GOLD FOR PREPARATORY ORATORY, presented by Mr. Clement C. Mitchell, of the class of '04, was awarded to

James Vermont Robins, Hillsboro, New Mexico.

THE MASON MEDAL, donated by Mr. George Mason, of Chicago, to the student in the Preparatory School whose scholastic record has been the best during the school year was awarded to

Patrick Dougherty, Chicago, Illinois.

THE COMMERCIAL MEDAL given to the student who has attained the best record in Commercial subjects for the school year was awarded to

Carl Aloysius Meyer, Monroeville, Ohio.

COMMERCIAL DIPLOMAS were awarded to

Francis Edward Quish, Dexter, Michigan.

Carl Meyer, Monroeville, Ohio.

Joseph Henry Meyer, Wellsburg, West Virginia.

Reinhold Lang, Berlin, Ontario, Canada.

William Elbert Carrico, Raywich, Kentucky.

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It is desired that every graduate receive a copy of the Bulletin. The Faculty will therefore consider it a favor to be notified in case an Alumnus changes his address.

On application to the President, bulletins will be sent to all who are interested in the work of the University.