The Journal of Geology

A SEMI-QUARTERLY MAGAZINE OF GEOLOGY AND RELATED SCIENCES

Subscription $3.00 per Year

43

Chicago, May 25, 1905.

President W. R. Harper,

University of Chicago.

My dear President Harper:-

In a recent visit at Madison I learned that the faculty there are considering the development of an Engineering-Commercial course, the central idea being, as I gathered it, to lay a strong foundation in mechanics and other engineering subjects upon which to build technical knowledge and the philosophy of commercial enterprise. It seems to me that the thought is an exceedingly happy one both from the view-point of training and of informational preparation. The solid rigorous work required in engineering courses must in the nature of the case fit men for certain of the industrial enterprises while it would render them familiar with the principles which underlie many industrial operations. If, for example, a student were preparing for manufacturing or transportation a training in mechanical engineering would be an admirable preparation both in the line of discipline and of intelligence. I gathered that this was not the limit of what was in mind. The scheme is not essentially different from that embodied in some of the younger courses that have proved gratifying successes, the Civic Historic course in particular.

May 25, 1905.

President W. R. Harper,

University of Chicago.

My dear President Harper:-

In a recent visit at Madison I learned that the faculty there are considering the development of an Engineering-Commercial course, the central idea being, as I gathered it, to lay a strong foundation in mechanics and other engineering subjects upon which to build technical knowledge and the philosophy of commercial enterprise. It seems to me that the thought is an exceedingly happy one both from the view-point of training and of informational preparation. The solid rigorous work required in engineering courses must in the nature of the case fit men for certain of the industrial enterprises while it would render them familiar with the principles which underlie many industrial operations. If, for example, a student were preparing for manufacturing or transportation a training in mechanical engineering would be an admirable preparation both in the line of discipline and of intelligence. I gathered that this was not the limit of what was in mind. The course is not essentially different from that embodied in some of the younger courses that have proved gratifying successes, the Civil Historic course in particular.

The idea is susceptible of considerable extension in various modern lines. A dozen or more combinations in literary and scientific as well as semi-professional fields seem to be possible without involving more courses than would be offered in a well deployed university in any case and the organization of such courses has the advantage of attracting students and directing elections in consistent and helpful lines.

As the recent action of the faculties clears the way for the organization of a series of curricula adapted to different classes of demands and as I have reason to think that something of this kind on lines individualized to suit our University has lain in your mind and those of others interested in the recent movement, I venture to suggest the wisdom of pressing on rapidly with such organization so as not to seem to follow our worthy neighbor.

Very truly yours,

T. C. Chamberlin

The idea is susceptible of considerable extension in various modern lines. A dozen or more combinations in literary and scientific as well as semi-professional fields seem to be possible without involving more courses than would be offered in a well developed university in any case and the organization of such courses has the advantage of attracting students and directing elections in constant and helpful lines.

At the recent action of the faculties clears the way for the organization of a series of curricula adapted to different classes of demands and as I have reason to think that something of this kind on lines individualized to suit our University has lain in your mind and those of others interested in the recent movement, I venture to suggest the wisdom of pressing on rapidly with such organization so as not to seem to follow our worthy neighbor.

Very truly yours,

THE FACULTIES OF
ARTS, LITERATURE, AND SCIENCE

OFFICE OF THE DEAN OF THE
JUNIOR COLLEGES

The University of Chicago
FOUNDED BY JOHN D. ROCKEFELLER

CHICAGO, August 28, 1906.

My dear Mr. Judson:

I send herewith the Engineering program. In regard to it the following points are to be noted:

(1) The detailed description of some of the courses in the last section of the report will be furnished by Dr. Belfield. I am sending to him a duplicate in order that he may see the general form.

(2) In accordance with our discussion it would be preferable to have the material set up like the Hand Book.

(3) The Trustees would have to confirm Engineering tuition $ 50 per quarter, on payment of which students may take four courses and are exempt from the Shop fee of $ 1.

(4) The only matter requiring Faculty ~~permission~~ action is the permission to take the Title of Associate on completion of the requirements with the exception of the nine majors in one Department. By action of the Faculty Medical students are already exempt in this respect. The budget, as I make it out, is as follows:

(5) Special courses 1, & 2- $ 100.
" " 3- $ 100.
" " 4- $ 200.

(Three different instructors required and two alternative courses offered).

Special course 5- $ 100.
" " 6- $ 100
" " 8- $ 100

THE FACULTIES OF
ARTS, LITERATURE, AND SCIENCE

OFFICE OF THE DEAN OF THE
JUNIOR COLLEGES

The University of Chicago
FOUNDED BY JOHN D. ROCKEFELLER

CHICAGO,

Shop fee $ 1 per student, say $ 20. Total $ 720. Twenty-four students paying $ 10 per quarter for three quarters will bring in exactly this amount.

I had inquiries today in regard to two new students who are coming to take Engineering work.* Please arrange that the printing of this may be pressed in order that it may not fail to be ready before October 1st.*

Sincerely yours,

Alexander Smith
Dean.

S.

We also plan contemplate Taking care of about 40 students altogether, and will not suffer if any sudden increase occurs.

* Mr Millikan should see the proof.

THE FACULTIES OF
ARTS, LITERATURE, AND SCIENCE

OFFICE OF THE DEAN OF THE
JUNIOR COLLEGES

The University of Chicago
FOUNDED BY JOHN D. ROCKEFELLER

CHICAGO, November 7, 1906.

Dear Mr. Judson:-

The special courses in Engineering this Quarter are:

Drawing: Mr. Williams of Univ. High School, $100.00
Drawing (Advanced): Mr. Ferson of Univ. High School, $100.

The registration is slowly growing. I am sending men over every week.

(1) I have now names of 40 junior, senior and unclassified men who are taking an engineering course, and am just sending out a second call to those who did not state their profession in reply to the first inquiry.

(2) Many of these have already had more or less of this technical work in high school. I am sending to the 40 a detailed inquiry blank to find out just where each stands. Some are not in a hurry, or have not had the elementary mathematics required to enable them to start in this year. If you are interested I shall report the exact status of the whole group ~~now.~~ soon

(3) Some who have had freehand drawing (being given this term) will enter mechanical drawing the second term. I shall assume that these pay $5.00 extra for the one term's work, unless instructed to the contrary.

(4) Expect a rush into Surveying (which will cost nothing extra) and shop work in spring.

(5) The registration at this moment according to cards in office, is: course 1 - 9 and course 5 - 2. But I am holding a strict round up and think there will be more.

Yours sincerely,

Alexander Smith Dean.

DEPARTMENT OF ELECTRICAL ENGINEERING

Henry H. Norris, Professor
George S. Macomber, Assistant Professor
Boyd C. Dennison, Instructor
Irving C. Pettit, Instructor
Anson M. Holcomb, Instructor
Frank C. Loring, Instructor
Frank G. Tappan, Instructor
Vladimir Karapetoff, Professor
Walter S. Ford, Assistant Professor
Charles H. Tower, Instructor
Fred H. Kroger, Instructor
John F. H. Douglas, Instructor
William E. Hogan, Instructor
Louis F. Blume, Instructor
Alexander D. DuBois, Instructor

SIBLEY COLLEGE OF
MECHANICAL ENGINEERING AND
THE MECHANIC ARTS

CORNELL UNIVERSITY

ITHACA, N. Y., Feb. 24, 1909

Prof. George E. Vincent,

University of Chicago,

Chicago, Ill.

Dear Sir :-

Referring to your letter of Jan. 28th I take the liberty of submitting to you enclosed a plan of a proposed graduate school in engineering, to be organized at the University of Chicago. You will see from the plan, that such a school could be organized and successfully conducted at a comparatively small expense. With my idea of co-operating with industrial concerns and with the government there would be no necessity for expensive laboratories, shops, drafting rooms, etc. Moreover, young graduates from good technical schools who have had a year or two of practical experience need "points of view" and "methods of thinking" much more than shops and laboratories.

There is undoubtedly a great and urgent demand for such a graduate school; we need leaders in the engineering professions, and a necessary part of their education is a training in critical, logical thinking along advanced professional lines.

You will see from the plan that the present facilities of the University in the departments of mathematics, physics

Prof. George E. Vincent,

University of Chicago,

Chicago, Ill.

Dear Sir :-

Referring to your letter of Jan. 28th I take the liberty of submitting to you enclosed a plan of a proposed graduate school in engineering, to be organized at the University of Chicago. You will see from the plan, that such a school could be organized and successfully conducted at a comparatively small expense. With my idea of co-operating with industrial concerns and with the government there would be no necessity for expensive laboratories, shops, drafting rooms, etc. Moreover, young graduates from good technical schools who have had a year or two of practical experience need "points of view" and "methods of thinking" much more than shops and laboratories.

There is undoubtedly a great and urgent demand for such a graduate school; we need leaders in engineering professions, and a necessary part of their education is a training in critical, logical thinking along advanced professional lines.

You will see from the plan that the present facilities of the University in the departments of mathematics, physics

and chemistry can be utilized to a considerable extent; the graduate engineering school can be thus started without burdening itself with a clumsy fixed equipment, and can follow such a path of development as the needs of the industry shall dictate.

The whole scheme is perfectly clear in my mind, and I should be happy to be called upon to help to organize this school. I was fortunate in having both academic training and practical experience in all three branches of engineering -civil, electrical, and mechanical. My name is quite well known among electrical engineers in this country, and I can submit to you four large volumes of my writings to substantiate my claims. I can also give you the names of a number of leading engineers in this country and abroad, as references in regard to my ability and character.

Besides myself, I have in mind two of my friends among Cornell faculty, one in mechanical engineering and one in civil engineering; they are men of national reputation and in the prime of middle age. We three could organize the school and conduct it with all the competence, enthusiasm, and unity of purpose that such an enterprise requires.

Hundreds of engineers have been graduated from Cornell who took our work, and who know us, so that there would be no lack of applications from our former students the very first year the graduate school is started.

Very truly yours,

V. Karapetoff

and chemistry can be utilized to a considerable extent; the graduate engineering school can be thus started without burdening itself with a clumsy fixed equipment, and can follow such a path of development as the needs of the industry shall dictate.

The whole scheme is perfectly clear in my mind, and I should be happy to be called upon to help to organize this school. I was fortunate in having both academic training and practical experience in all three branches of engineering -civil, electrical, and mechanical. My name is quite well known among electrical engineers in this country, and I can submit to you four large volumes of my writings to substantiate my claims. I can also give you the names of a number of leading engineers in this country and abroad, as references in regard to my ability and character.

Besides myself, I have in mind two of my friends among Cornell faculty, one in mechanical engineering and one in civil engineering; they are men of national reputation and in the prime of middle age. We three could organize the school and conduct it with all the competence, enthusiasm, and unity of purpose that such an enterprise requires.

Hundreds of engineers have been graduated from Cornell who took our work, and who know us, so that there would be no lack of applications from our former students the very first year the graduate school is started.

Very truly yours,

+61

The University of Chicago

FOUNDED BY JOHN D. ROCKEFELLER

The Faculties of Arts, Literature and Science

OFFICE OF THE DEAN

Chicago, Ill., March 6, 1909.

President H. P. Judson,

Faculty Exchange.

My dear Mr. Judson:

Enclosed please find the correspondence with Professor Karapetoff of Cornell University. It may be that he is a dissatisfied professor seeking a new place or it may be he is a man of a good deal of ability who sees larger possibilities than the Cornell situation offers. You will note that he refers to two of his friends among the Cornell faculty whom he has in mind as possible co-operators in this plan.

You will also be interested in the outline which is submitted. If there were any chance of our being able to do anything in this direction within reasonable time, it would seem to me distinctly worth while to look up Professor Karapetoff and learn something more definite about him and his work.

Yours sincerely,

George E. Vincent.

The University of Chicago

THE FACULTIES OF ARTS, LITERATURE AND SCIENCE

OFFICE OF THE DEAN

Chicago, Ill., March 6, 1909.

President H. P. Judson,

Fan City Exchange.

My dear Mr. Judson:

Enclosed please find the correspondence with Professor Karpetoff of Cornell University. It may be that he is a disenthralled professor seeking a new place or it may be he is a man of a good deal of ability who sees larger possibilities than the Cornell situation offers. You will note that he refers to two of his friends among the Cornell faculty whom he has in mind as possible co-operators in this plan.

You will also be interested in the outline which is submitted. If there were any chance of our being able to do anything in this direction within reasonable time, it would seem to me distinctly worth while to look up Professor Karpetoff and learn something more definite about him and his work.

Yours sincerely,

Geo. E. Vincent.

PROPOSED PLAN OF A GRADUATE ENGINEERING SCHOOL
AT THE UNIVERSITY OF CHICAGO.

---

1. To be admitted to the graduate school the applicant must be a graduate of a first class college of engineering, and must have had after graduation at least one (preferably two) years of experience in practical engineering. Credit for experience before graduation may be given in exceptional cases only.

2. Instruction will be given in three principal branches of engineering; mechanical, electrical, and civil, each branch being represented by one professor; one of these professors may act as the dean of the school. Later on, if need should arise, other branches may be added, such as mining engineering, textile industry, chemical engineering, etc.

3. The degree of Master of Engineering will be given after a successful completion of one year's work at the school. The degree of Doctor of Engineering will be conferred after three years' work, either at the school, or outside, as prescribed by the school.

4. The work in various branches of engineering will be conducted along three distinct lines :-

(a) A critical review of parts of undergraduate work (connecting link with graduate work).

(b) Advanced courses in engineering branches, and in auxiliary sciences, such as mathematics, me-

PROPOSED PLAN OF A GRADUATE ENGINEERING SCHOOL

AT THE UNIVERSITY OF CHICAGO.

---

1. To be admitted to the graduate school the applicant must be a graduate of a first class college of engineering, and must have had after graduation at least one (preferably two) years of experience in practical engineering. Credit for experience before graduation may be given in exceptional cases only.

2. Instruction will be given in three principal branches of engineering; mechanical, electrical, and civil, each branch being represented by one professor; one of these professors may act as the dean of the school. Later on, if need should arise, other branches may be added, such as mining engineering, textile industry, chemical engineering, etc.

3. The degree of Master of Engineering will be given after a successful completion of one year's work at the school. The degree of Doctor of Engineering will be conferred after three years' work, either at the school, or outside, as prescribed by the school.

4. The work in various branches of engineering will be conducted along three distinct lines :-

(a) A critical review of parts of undergraduate work (connecting link with graduate work).

(b) Advanced courses in engineering branches, and in auxiliary sciences, such as mathematics, me-

chanics, physics and chemistry.

(c) Original research (thesis).

In addition to these, a limited amount of time may be devoted to subjects of general culture given in other departments of the University.

5. Thesis may be of one of the following kinds, or their combination :

(a) History of development of an idea, a construction, a system, or of a theory in engineering ;

(b) An original theoretical investigation ;

(c) Design of a machine, a structure, etc., embodying new and original features ;

(d) Experimental research;

6. Experimental research will be conducted as much as possible in co-operation with various manufacturing and contracting concerns, also with the various branches of the government. The following advantages are obtained thereby :

(a) There will be no necessity for equipping the school with bulky and expensive machines; the equipment will consist merely of the most important measuring instruments, which may be purchased from year to year, as the need arises. Experience of other schools shows, that industrial organizations as a rule are glad to loan their machinery for tests, and are even willing to offer to students facilities for research in their plants, under the supervision

chanics, physics and chemistry.

(c) Original research (theses).

In addition to these, a limited amount of time may be devoted to subjects of general culture given in other departments of the University.

5. Theses may be of one of the following kinds, or their combination :

(a) History of development of an idea, a construction, a system, or of a theory in engineering ;

(b) An original theoretical investigation ;

(c) Design of a machine, a structure, etc., embodying new and original features ;

(d) Experimental research.

6. Experimental research will be conducted as much as possible in co-operation with various manufacturing and contracting concerns, also with the various branches of the government. The following advantages are obtained thereby :

(a) There will be no necessity for equipping the school with bulky and expensive machines; the equipment will consist merely of the most important measuring instruments, which may be purchased from year to year, as the need arises. Experience of other schools shows, that industrial organizations as a rule are glad to loan their machinery for tests, and are even willing to offer to students facilities for research in their plants, under the supervision

of professors.

(b) The research is sure to be conducted along useful and live subjects, the school being all the time in close touch with the industry and the government.

(c) Graduates who should become interested in a certain branch of research and prove efficient in it will find no difficulty in securing positions with concerns for which they have conducted research.

(d) The very fact of this co-operation will prove a potent factor in drawing the best engineering talent to the school, both as regards faculty and students.

Respectfully Submitted
by V. Karapetoff

Feb. 25th 1909
Ithaca, N.Y.

of professors.

(b) The research is sure to be conducted along useful and live subjects, the school being all the time in close touch with the industry and the government.

(c) Graduates who should become interested in a certain branch of research and prove efficient in it will find no difficulty in securing positions with concerns for which they have conducted research.

(d) The very fact of this co-operation will prove a potent factor in drawing the best engineering talent to the school, both as regards faculty and students.

Respectfully submitted

Wm. Kent

Feb. 25th 1909
Ithaca, N.Y.

Curricula and Regulations for the First Two Years of Engineering.

§1. The branches of Engineering in which work is offered are: Civil, Mechanical, Mining, Architectural, Chemical, and Electrical. The curricula in these six lines are identical up to the end of the first college year.(1) By including in the preparatory and college work (§§3, 5) the courses in the following synopsis, and by completing six extra courses (in Mining, five and one-half) of a technical nature (§4) one each quarter, students preparing to enter a school of engineering may complete the admission requirements to, and the usual work of the first two years in such a school (For period of residence see §6).

§2. Preparatory Work for all Curricula in Engineering. The following work is all required, and as much of it as possible should be offered for admission:

Algebra	1 1/2 units	English	3 units
Pl. Geom.	1 "	History *	1 "
Sol. Geom.	1/2 "	" Mod. or U.S.*	1/2 "
Trigonom.*	1/2 "	Language *	3 "
Physics *	1 "	" Mod. *	2 "
Chemistry *	1 "		
		Total	15 units.

Omitted units, marked thus, * , may be made up in the Junior Colleges, all others in the University High School. Postponment of the Trigonometry, history, and part of the modern language will cause the least convenience.

---

(1) The second year in Architectural Engineering is not at present offered at the University of Chicago.

Curricula and Regulations for the First Two Years of Engineering.

§ 1. The branches of Engineering in which work is offered are: Civil, Mechanical, Mining, Architectural, Chemical, and Electrical. The curricula in these six lines are identical up to the end of the first college year.(1) By including in the preparatory and college work (§§ 3, 5) the courses in the following synopsis, and by completing six extra courses (in Mining, five and one-half) of a technical nature (§ 4) one each quarter, students preparing to enter a school of engineering may complete the admission requirements to, and the usual work of the first two years in such a school (For period of residence see § 6).

§ 2. Preparatory Work for all Curricula in Engineering. The following work is all required, and as much of it as possible should be offered for admission:

Algebra	1	1/2 units	English	3 units
Pl. Geom.	1	"	History *	1 "
Sol. Geom.		1/2 "	" Mod. or U.S. *	1/2 "
Trigonom. *		1/2 "	Language *	3 "
Physics *	1	"	" Mod. *	2 "
Chemistry *	1	"		
			Total	15 units.

Omitted units, marked thus, * , may be made up in the Junior Colleges, all others in the University High School. Postponement of the Trigonometry, History, and part of the modern language will cause the least inconvenience.

---

(1) The second year in Architectural Engineering is not at present offered at the University of Chicago.

§ 3. College Work Common to all Curricula in Engineering. The departmental numbers of the courses are given in parenthesis, and the quarters of the year in which the work in each Department may be begun are added. To complete the work within the minimum time, however, the program in § 7 must be adhered to. The pre-requisites (Handbook, § 15, p 13) should be kept in mind.

College Algebra (2)	1 Mj, Any quarter	
Analytics (3)	1 Mj, Sum. Aut. Spr.	
Calculus (19,20)	2 Mj, Winter	
Physics (3, 4, 5)	3 Mj, Any quarter, Aut. preferable.	
Chemistry (2S, 3S, 6)	3 Mj, Sum. Aut.	
English (1, 3)	2 Mj, Any quarter.	Total 12 Mj.

Preparatory units (§ 2) not offered for admission become requirements in College and are then additional to the above.

§ 4. Extra Courses of a Technical Nature (usually 6 Mj.) The courses common to all Engineering curricula, with their corresponding numbers (§ 9), are: Freehand drawing (1) 1/2 Mj; Shop work (4) 1 Mj; Descriptive Geometry and Mechanical Drawing (2) 1/2 Mj; (3) 1 Mj; (5) 1 Mj.

In Civil Engineering the above 4 Mj and: Spherical Trigonometry (Math. 6) 1/2 Mj; Introduction to Surveying (Math. 5) 1/2 Mj; Surveying and Topography (7) 1 Mj; Total 6 Mj.

In Mining Engineering, the above 4 Mj and: Introduction to Surveying (Math. 5) 1/2 Mj; Surveying and Topography (7) 1 Mj; Total 5 1/2 Mj.

In Mechanical, Chemical, and Electrical Engineering, the above 4 Mj and : Mechan. Engin. Drawing (6) 1 Mj; Mechanism (8) 1 Mj; Total 6 Mj.

§ 3. College Work Common to all Curricula in Engineering.

The departmental numbers of the courses are given in parenthesis, and the quarters of the year in which the work in each Department may be begun are added. To complete the work within the minimum time, however, the program in § 7 must be adhered to. The pre-requisites (Handbook, § 15, p 13) should be kept in mind.

College Algebra (2)	1 M¼,	Any quarter
Analytics (3)	1 M¼,	Sum. Aut. Spr.
Calculus (19,20)	2 M¼,	Winter
Physics (3, 4, 5)	3 M¼,	Any quarter, Aut. preferable.
Chemistry (2B, 3B, 6)	3 M¼,	Sum. Aut.
English (1, 3)	2 M¼,	Any quarter. Total 12 M¼.

Preparatory units (§ 2) not offered for admission become requirements in College and are then additional to the above.

§ 4. Extra Courses of a Technical Nature (usually 6 M¼.) The courses common to all Engineering curricula, with their corresponding numbers (§ 9), are: Freehand drawing (1) 1/2 M¼; Shop work (4) 1 M¼; Descriptive Geometry and Mechanical Drawing (2) 1/2 M¼; (3) 1 M¼; (9) 1 M¼.

In Civil Engineering the above 4 M¼ and: Spherical Trigonometry (Math. 6) 1/2 M¼; Introduction to Surveying (Math. 8) 1/2 M¼; Surveying and Topography (7) 1 M¼; Total 6 M¼.

In Mining Engineering, the above 4 M¼ and: Introduction to Surveying (Math. 8) 1/2 M¼; Surveying and Topography (7) 1 M¼; Total 6 1/2 M¼.

In Mechanical, Chemical, and Electrical Engineering, the above 4 M¼ and : Mechan. Engin. Drawing (6) 1 M¼; Mechanism (8) 1 M¼; Total 6 M¼.

§5. Additional College Courses in Certain Engineering Curricula.

Civil :	none	
Mechan:	none	
Mining:	Geology 10 (Mineralogy)	1/2 Mj.
	Chemistry 7, 10 (qual. anal.)	2 Mj.
	Geology 2(general)	1 Mj.
	Geology (struct. & strat.)	1 Mj.
		Total 4 1/2 Mj.
Chem:	Geology 10 (mineralogy)	1/2 Mj.
	Chemistry 7, 10, 8 (qual. & quant. anal.)	3 Mj.
		Total 3 1/2 Mj.
Electr.	Physics 12 (acoustics & light)	1 Mj.
		Total 1 Mj.

§ 6. The Period of Residence. As may be seen, the minimum period of residence at the University of Chicago within which the least heavy of the above requirements may be fulfilled is six quarters. More that three majors per quarter will have to be carried, or the total period of residence correspondingly prolonged, in case (1) any of the required preparatory units are not offered for admission, (2) the order and choice of courses given in the programme (§ 8, below) is not adhered to, (3) Mining, Chemical or Electrical Engineering is chosen, since these curricula involve additional College work (§ 5). On the other hand, the admission requirements and the curricula of schools of Engineering vary within wide limits and students intending to enter particular schools may frequently anticipate all the requirements up to the end of the second year of such schools while omitting certain of the requirements specified above.

Since many students will fail to offer for admission the

§5. Additional College Courses in Certain Engineering Curricula.

Civil:	none	
Mechan:	none	
Mining:	Geology 10 (Mineralogy)	1/2 M$.
	Chemistry 7, 10 (qual. anal.)	2 M$.
	Geology 2 (General)	1 M$.
	Geology (struct. & strat.)	1 M$.
	Total 4 1/2 M$.	
Chem:	Geology 10 (mineralogy)	1/2 M$.
	Chemistry 7, 10, 8 (qual. & quant. anal.)	3 M$.
	Total 3 1/2 M$.	
Electr.	Physics 12 (acoustics & light)	1 M$.
	Total 1 M$.	

§ 6. The Period of Residence. As may be seen, the minimum period of residence at the University of Chicago within which the least heavy of the above requirements may be fulfilled is six quarters. More that three majors per quarter will have to be carried, or the total period of residence correspondingly prolonged, in case (1) any of the required preparatory units are not offered for admission, (2) the order and choice of courses given in the programme (§ 8, below) is not adhered to, (3) Mining, Chemical or Electrical Engineering is chosen, since these curricula involve additional College work (§ 5). On the other hand, the admission requirements and the curricula of schools of Engineering vary within wide limits and students intending to enter particular schools may frequently anticipate all the requirements up to the end of the second year of such schools while omitting certain of the requirements specified above.

Since many students will fail to offer for admission the

solid geometry, and trigonometry and part of the modern language requirement, such students will of necessity add to the college requirements two majors for every unit postponed.

§ 7. Tuition. All students registered for any of the extra technical courses (§ 4 above) pay an inclusive Engineering tuition fee of $ 50 per quarter. No special fee is exacted, however, when " Spherical Trigonometry " and " Introduction to Surveying " are taken, since these are regular College courses in the department of Mathematics. Students paying Engineering tuition, with consent of their Dean, are permitted to take three College courses in addition to the extra course.[1] Students whose period of residence is not limited by circumstances to six quarters, however, are advised to take only two college courses in addition to the extra course.

§ 8. Suggested Program for Students of Engineering.

First Year.

	Autumn	Winter	Spring
8:30	(Trig.)	(Mod. Lang. or Hist.)	(Mod. Lang. or Hist.)
9:30	Eng. 1	Math. 2	" " " "
11:00	Physics 3	Physics 4	Physics 5
12:00	" "	" "	Math. 3
2:00			
3:00-5:00	Engin. 1, 2.	Engin. 3	Engin. 4

Notes: Required college courses are in black type: courses in satisfaction of postponed admission units in parenthesis. Trigonometry, if not offered for admission, must be taken in Autumn at 8:30, since it is prerequisite to Math. 2.

The courses of the first year are alike in all Engineering curricula.

---

(1) When students in Engineering desire also to secure the title of "Associate in Science ", they may do so provided they fulfill the requirements of the College of Science. These include three majors not forming part of the above technical curricula, viz, Philosophy or Psychology, 1 Mj; and Pol. Econ., Pol. Sci., Hist., or Soc., 2 Mj.

solid geometry, and trigonometry and part of the modern language requirement, such students will of necessity add to the college requirements two majors for every unit postponed.

§ 7. Tuition. All students registered for any of the extra technical courses (§ 4 above) pay an inclusive Engineering tuition fee of $ 50 per quarter. No special fee is exacted, however, when " Spherical Trigonometry and " Introduction to Surveying " are taken, since these are regular College courses in the department of Mathematics. Students paying Engineering tuition, with consent of their Dean, are permitted to take three College courses in addition to the extra courses.[1] Students whose period of residence is not limited by circumstances to six quarters, however, are advised to take only two college courses in addition to the extra courses.

§ 8. Suggested Program for Students of Engineering.

First Year.

	Autumn	Winter	Spring
8:30	(Trig.)	(Mod. Lang. or Hist.)	(Mod. Lang. or Hist.)
9:30	Eng. 1	Math. 2	" " "
11:00	Physics 3	Physics 4	Physics 5
12:00	" "	" "	Math. 3
2:00			
3:00-5:00	Engin. 1, 2.	Engin. 3	Engin. 4

Notes: Required college courses are in black type: courses in satisfaction of postponed admission units in parenthesis.
Trigonometry, if not offered for admission, must be taken in Autumn at 8:30, since it is prerequisite to Math. 2.
The courses of the first year are alike in all Engineering curricula.

---

(1) When students in Engineering desire also to secure the title of "Associate in Science ", they may do so provided they fulfill the requirements of the College of Science. These include three majors not forming part of the above technical curricula, viz, Philosophy or Psychology, 1 M; and Pol. Econ., Pol. Sci., Hist., or Soc., 2 M.

Second Year.

	Autumn	Winter	Spring
8:30	Chem. 2Sa	Chem. 3Sa	
9:30		Math. 19	Math. 20
11:00	Eng. 3	Math. 6, 5	
12:00			
2:00	Chem. 2Sa M. Tu.	Chem. 3Sa M. Tu.	Chem. 6
3:00-5:00	Engin. 5 W. Th. F.	Engin. 6 W. Th. F.	Engin. 7 or 8

Notes: In Winter, Civil engineers take Math. 6 and 5, but not Engin. 6; Mining engineers take Math. 5, but not Math. 6, or Engin. 6; Mechanical, Chemical, and Electrical engineers take Engin. 6, but not Math. 6 and 5.

In Spring, Civil and Mining engineers take Engin. 7; Mechanical, Chemical, and Electrical engineers take Engin. 8.

The vacant hours are available for postponed admission requirements and for the extra courses required in a certain curricula (§ 5).

§ 9. Description of the Extra Courses of a Technical Nature.[1]

Courses in Mathematics.

5. Introduction to Surveying. The students will be made familiar with general problems of surveying. The instruments used in the field will be studied in detail and their errors determined. As weather permits, field work with chain, tape, and compass will be begun.

Prerequisite: Math. 1.

1/2 Mj Winter Quarter W. Th. F. 11:00 (Laves)

6. Spherical Trigonometry. Emphasis will be laid upon the application of the subject matter to Astronomy, Surveying, Geography, and Geodosy. With demonstrations and observations in the observatory. Prerequisite: course 1.

1/2 Mj Winter Quarter M. Tu. 11.00 (Laves)

---

[1] For a description of the regular college courses, see the College Circular or Annual Register.

Second Year.

	Autumn	Winter	Spring
8:30	Chem. 25a	Chem. 35a	
9:30		Math. 19	Math. 20
11:00	Eng. 3	Math. 6, 5	
12:00			
2:00	Chem. 25a M. Tu.	Chem. 35a M. Tu.	Chem. 6
3:00-5:00	Engin. 5 W. Th. F.	Engin. 6 W. Th. F.	Engin. 7 or 8

Notes: In Winter, Civil engineers take Math. 6 and 5, but not Engin. 6; Mining engineers take Math. 5, but not Math. 6, or Engin. 6; Mechanical, Chemical, and Electrical engineers take Engin. 6, but not Math. 6 and 5.

In Spring, Civil and Mining engineers take Engin. 7; Mechanical, Chemical, and Electrical engineers take Engin. 8.

The vacant hours are available for postponed admission requirements and for the extra courses required in a certain curricula (§ 5).

§ 9. Description of the Extra Courses of a Technical Nature.[1]

Courses in Mathematics.

5. Introduction to Surveying. The students will be made familiar with general problems of surveying. The instruments used in the field will be studied in detail and their errors determined. As weather permits, field work with chain, tape, and compass will be begun.

Prerequisite: Math. 1.

1/2 M4 Winter Quarter W. Th. F. 11:00 (Laves)

6. Spherical Trigonometry. Emphasis will be laid upon the application of the subject matter to Astronomy, Surveying, Geography, and Geodesy. With demonstrations and observations in the observatory. Prerequisite: course 1.

1/2 M4 Winter Quarter M. Tu. 11.00 (Laves)

---

[1] For a description of the regular college courses, see the College Circular or Annual Register.

Courses in Engineering.

1. Freehand Drawing. (Description will be furnished by Dr. Belfield.)

1 M. Autumn Quarter (First Term) 3:00-5:00 (Williams)

2. Descriptive Geometry and Mechanical Drawing I.
(See Dr. Belfield.)

Prerequisite Engin. 1.

1 M. Autumn Quarter (Second Term) 3:00-5:00 (Williams)

3. Descriptive Geometry and Mechanical Drawing II.

Prereq. Engin. 2

1 Mj Winter Quarter 3:00-5:00 (Williams)

4. Shop Work. The content of this course varies with the branch of engineering chosen. Mechanical engineers take 4A, 4 B and 4C; Electrical engineers take 4A and 4D; others take either 4A, 4B and 4C or 4a and 4 D and should consult their Dean in regard to the choice. Prerequisite, Engin. 1, 2, 3.

Courses in Engineering.

1. Freehand Drawing. (Description will be furnished by Dr. Belfield.)

1 M. Autumn Quarter (First Term) 3:00-5:00 (Williams)

2. Descriptive Geometry and Mechanical Drawing I. (See Dr. Belfield.)

Prerequisite Engin. 1.

1 M. Autumn Quarter (Second Term) 3:00-5:00 (Williams)

3. Descriptive Geometry and Mechanical Drawing II.

Prereq. Engin. 2

1 M. Winter Quarter 3:00-5:00 (Williams)

4. Shop Work. The content of this course varies with the branch of engineering chosen. Mechanical engineers take 4A, 4 B and 4C; Electrical engineers take 4A and 4D; others take either 4A, 4B and 4C and 4 D and should consult their Dean in regard to the choice. Prerequisite, Engin. 1, 2, 3.

4A. Wood Working.

Dr. Belfield will describe.

(60 hrs.)

1M. Spring Quarter, 3:00-5:00 (Mr.)

4B. Wood Working (continuation)

Dr. Belfield will describe.

(30 hrs.)

1/2 M. Spring Quarter 3:00-5:00 (Mr.)

4 C Foundry.

Dr. Belfield will describe.

(30 hrs.)

1/2 M. Spring Quarter, 3:00-5:00 (Mr.)

4 D Machine Shop

Dr. Belfield will describe.

1 M. Spring Quarter 3:00-5:00 (Mr.)

4A. Wood Working.

Dr. Belfield will describe.

(60 hrs.)

1M. Spring Quarter, 3:00-5:00 (Mr.)

4B. Wood Working (continuation)

Dr. Belfield will describe.

(30 hrs.)

1/2 M. Spring Quarter 3:00-5:00 (Mr.)

4 C Foundry.

Dr. Belfield will describe.

(30 hrs.)

1/2 M. Spring Quarter, 3:00-5:00 (Mr.)

4 D Machine Shop

Dr. Belfield will describe.

1 M. Spring Quarter 3:00-5:00 (Mr.)

5. Descriptive Geometry and Mechanical Drawing III.

Dr. Belfield will describe.

Prerequisite Engin. 1-4.

1 Mj Autumn Quarter W. Th. F. 2:00-5:00 (Ferson)

6. Mechanical Engineering Drawing.

Dr. Belfield will describe.

Prerequisite, Engin. 1-5.

1 Mj Winter Quarter W. Th. F. 2:00-5:00 (Ferson)

7. Surveying and Topography. Field Work with chain, tape, compass, transit, and level, supplemented by work in the drawing room where computation, scale drawings, and blue prints will be made.

Prerequisite, Introduction to Surveying, and Engin. 3.

1 Mj Spring Quarter 3:00-5:00 (Laves)

8. Mechanism.

Dr. Belfield will describe.

Prerequisite Engin. 1-7.

1 Mj Spring Quarter, 3:00-5:00

1 M4 Spring Quarter, 3:00-5:00

Prerequisite Engin. 1-4.

Dr. Belfield will describe.

8. Mechanism.

1 M4 Spring Quarter 3:00-5:00 (Laves)

Prerequisite, Introduction to Surveying, and Engin. 3.

7. Surveying and Topography. Field Work with chain, tape, compass, transit, and level, supplemented by work in the drawing room where computation, scale drawings, and blue prints will be made.

1 M4 Winter Quarter W. Th. F. 2:00-5:00 (Person)

Prerequisite, Engin. 1-5.

Dr. Belfield will describe.

6. Mechanical Engineering Drawing.

1 M4 Autumn Quarter W. Th. F. 2:00-5:00 (Person)

Prerequisite Engin. 1-4.

Dr. Belfield will describe.

5. Descriptive Geometry and Mechanical Drawing III.