

University of Texas Bulletin

No. 2319: May 15, 1923

CATALOGUE

OF THE

COLLEGE OF MINES AND METALLURGY

EL PASO

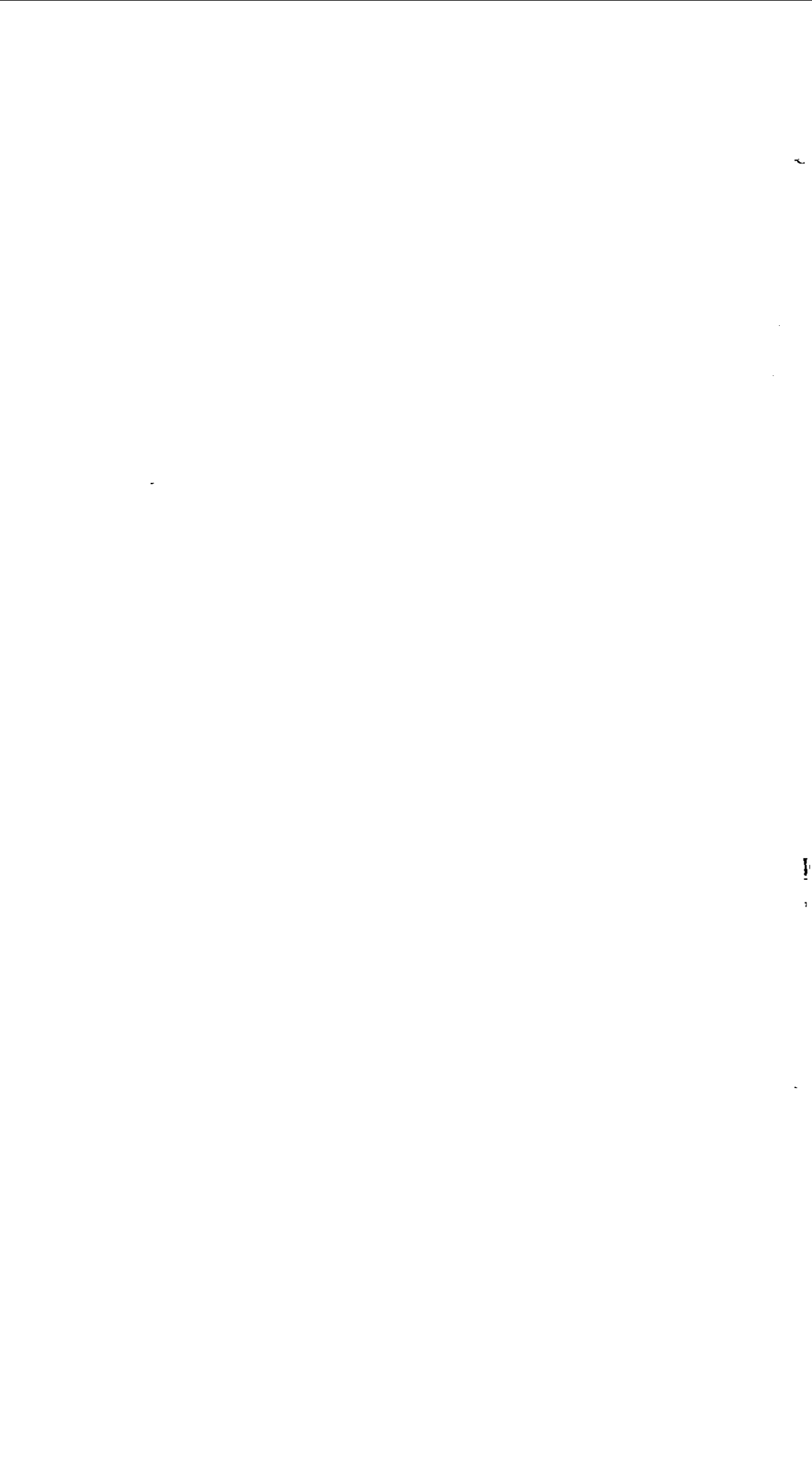
1922-1923

With Announcements for

1923-1924



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PUBLISHED BY THE UNIVERSITY FOUR TIMES A MONTH, AND
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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston.

Cultivated mind is the guardian genius of democracy. . . It is the only dictator that freemen acknowledge and the only security that freemen desire.

Mirabeau B. Lamar.

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BOARD OF REGENTS

OFFICERS

HENRY J. LUTCHER STARK, *Chairman*
C. E. KELLY, *Vice-Chairman*
E. J. MATHEWS, *Secretary*, Austin

REGENTS

Terms Expire January, 1923

W. H. FOLTS..... Austin
C. E. KELLY..... El Paso
LOUIS J. WORTHAM..... Fort Worth

Terms Expire January, 1925

FREDERICK W. COOK..... San Antonio
HENRY J. LUTCHER STARK..... Orange
H. A. WROE..... Austin

Terms Expire January, 1927

SAM P. COCHRAN..... Dallas
FRANK C. JONES..... Houston
MRS. H. J. O'HAIR..... Coleman

STANDING COMMITTEES

AUDITING: Messrs. Cochran, Jones.
BUILDINGS AND GROUNDS: Messrs. Folts, Kelly, Mrs. O'Hair.
COMPLAINTS AND GRIEVANCES: Mrs. O'Hair, Messrs. Cook, Jones.
EXECUTIVE: Messrs. Stark, Folts, Wroe.
FINANCE: Messrs. Cook, Kelly, Wortham.
LAND: Messrs. Wortham, Kelly, Cochran.
LEGISLATION: Messrs. Wroe, Jones, Wortham.
MEDICAL BRANCH: Messrs. Jones, Cook, Mrs. O'Hair.
COLLEGE OF MINES AND METALLURGY: Messrs. Kelly, Folts, Wortham.

The Board of Regents meets in Austin on the last Tuesday of January, March, and June; in Galveston on the second Tuesday in May; and in El Paso on the last Tuesday in October.

COLLEGE OF MINES AND METALLURGY

ADMINISTRATIVE OFFICERS

*ROBERT ERNEST VINSON, D.D., LL.D., *President.*

†STEVE HOWARD WORRELL, B.S., *Dean.*

JOHN WILLIAM KIDD, B.S., E.E., *Acting Dean.*

RUTH MONRO AUGUR, *Registrar.*

MRS. ALICE MORRIS, *Librarian.*

MRS. MAE PRYCE BROOKS, *Secretary.*

FACULTY

†STEVE HOWARD WORRELL, B.S., *Professor of Metallurgy; Dean of the College of Mines and Metallurgy.*

JOHN WILLIAM KIDD, B.S., E.E., *Professor of Engineering and Mathematics; Acting Dean of the College of Mines and Metallurgy.*

FRANKLIN HUPP SEAMON, E.M., *Professor of Chemistry.*

JULES LOUIS HENRY, *Bachelier ès Lettres-Philosophe, Adjunct Professor of Modern Languages.*

WILLIAM HENRY SEAMON, B.S., *Professor of Geology and Mining.*

EMMET ADDIS DRAKE, M.A., *Associate Professor of English and Economics.*

LOYD ALVINO NELSON, M.E., *Adjunct Professor of Engineering and Mathematics.*

MYRA CARROLL WINKLER, *Adjunct Professor of History and Economics.*

ROBERT MCCART, JR., E.M., *Acting Professor of Metallurgy.*

BURT FRANKLIN JENNESS, M.D., *Lecturer on First Aid and Hygiene and Sanitation.*

ARTHUR PEARSON, B.A., *Instructor in Physics.*

ARTHUR CORNWALLIS WHEATLEY, *Assistant in Metallurgy.*

JOHN KENNETH HARDY, *Assistant in Chemistry.*

WILLARD LORANE RUSSELL, *Power Plant Assistant.*

LEWIS MARTIN ROBINSON, *Assistant in Mineralogy.*

JACK CARUTHERS VOWELL, *Physical Director.*

CALENDAR

Registration begins on September 21, continuing through September 27.

The first semester begins on September 28, and ends on January 31.

The second semester begins on February 1, and ends on May 31.

*Resigned, effective July 1, 1923.

†Absent on leave from December 1, 1922, to June 1, 1923.

The summer work in surveying (Engineering 4) begins on September 1 and lasts four weeks.

The summer work in field geology begins on September 1.

The following holidays are observed: Armistice Day, Thanksgiving Day, Christmas recess (December 23 to January 2, inclusive), Washington's Birthday, Texas Independence Day, and San Jacinto Day.

The first semester examinations are held during the last week in January. The second semester examinations for the freshman, sophomore, and junior classes are held during the last week in May; for the senior class, one week earlier.

The examinations in summer work are held on the last day of the four weeks' period in each case.

Examinations to remove conditions are held at the next regular examination period in January or May, except that conditions incurred in May may, at the discretion of the dean, be removed the following September.

GENERAL INFORMATION

HISTORY

An announcement of a course in mining appeared in the University catalogue first in 1900-1901. From then until the session of 1910-1911, an arrangement of courses leading to the degree of Mining Engineer appeared annually. The catalogue of that year contained a statement that thereafter freshmen would not be enrolled in mining, and the arrangement of courses leading to a degree in that subject was subsequently omitted.

The Thirty-third Legislature, at its regular session in 1913, passed an act creating the State School of Mines and Metallurgy, to be located at El Paso. By the terms of the act, the School of Mines was placed under the control of the Board of Regents of the University. Early in 1919, by act of the Thirty-sixth Legislature, the school was made a branch of the University of Texas.

The location of the school at El Paso was conditioned upon the donation by the city of the former Military Institute buildings and grounds. The necessary funds for this donation were secured through the activity of the Chamber of Commerce, and the school was opened in September, 1914. On October 29, 1916, the Main Building was burned. It was then decided to remove the institution to a more suitable site, on the west side of Mount Franklin, donated for that purpose. The Thirty-fifth Legislature voted an emergency appropriation of \$100,000 to erect new buildings.

LOCATION

The location of the College of Mines and Metallurgy is advantageous in several ways. The city of El Paso stands at the crossing of several of the oldest highways established by white men on this

continent. With a population of 83,000, it is the most important city, south of Denver, between San Antonio and Los Angeles. Four transcontinental railroads cross the divide at this point.

El Paso's primary resources include mining, agriculture, live-stock, and timber. The United States government is spending \$10,000,000 on a great irrigation project to provide a cheap and unfailling water supply for the Rio Grande Valley above and below El Paso.

Its extreme dryness and medium latitude, combined with a moderately high altitude (4,000 feet), give El Paso a delightful and healthful climate all the year around.

Within a radius of from one to ten miles of El Paso are found in great variety those geological formations that are usually associated with the mining industry, not only in metal mining, but in coal mining as well. In opportunity for geological study, no mining school in the United States is more favorably located.

The second largest custom smelter in the world is situated about a mile from the College of Mines and Metallurgy. It is fully supplied with equipment for the most modern methods of treating such ores as copper, lead, gold, and silver as are suitable for smelting. Students will find this an exceptional opportunity.

BUILDINGS AND GROUNDS

The campus contains twenty-three acres. There are six buildings: Main Building, two dormitories, Chemistry Building, Power House, and Mill. The Main Building contains the administrative offices, laboratories, the library, and various class rooms. The Chemistry Building contains the laboratories in chemistry and assaying. The Power House contains the heating plant and the engineering laboratory. The Dormitory contains rooms for fifty students, with shower bath and lockers for the athletic teams, a kitchen, and a dining-room. Kelly Hall contains rooms only. The Mill contains machinery for the testing of ores. All the buildings, except the Mill, are of stone, and fireproof.

POLICY OF THE COLLEGE

Emphasis will be placed on the practical or applied side of the instruction. Theory and practice must go hand in hand, so to speak, the one supplementing the other. To further this idea, no member of the faculty will be employed, unless, in addition to his collegiate training, he has had at least five years' successful experience in the practice of his profession.

A thorough mastery by the student of the details of each required course offered will be insisted upon. In the future, as the demand may arise, supplementary courses will be offered enabling the student to specialize along various lines. It is the purpose of the college to

give the student a good general education, whether he follows the practice of mining and metallurgy as his life work or not.

Athletics are encouraged and play a prominent part in the student activities.

SPECIAL LECTURES

A series of lectures will be delivered before the Mining Club by members of the faculty and other engineers-residing in El Paso. The Mining Club is an affiliated student society of the American Institute of Mining Engineers.

OPPORTUNITIES FOR SELF-HELP

To the student who is working his way, a city of the size of El Paso offers a large field of opportunity. A student's labor bureau is maintained by the college, and every effort will be made to assist the student, but the college assumes no responsibility except to the extent of trying to help. No student should come to El Paso without funds sufficient for at least the first semester.

AFFILIATED SCHOOL SCHOLARSHIPS

The Board of Regents offers a scholarship annually to the best student among the young men and one to the best student among the young women in the graduating class of each accredited school having at least thirteen accredited units, provided that the recipient of each scholarship shall have made an average of at least ninety per cent in the senior year. These scholarships entitle the holders to exemption from matriculation fees in all the colleges and schools of the University except in the Medical Branch and in the Law School, so long as their conduct and standing are *satisfactory to the faculty, provided they enter the University before the end of the fall term of the second session after their graduation from the high school.*

REQUIREMENTS FOR ADMISSION

GENERAL REQUIREMENTS

Age. Applicants for admission must be at least sixteen years old. Applicants who seek admission by individual approval must be at least twenty-one years old.

Character. Applicants for admission must furnish evidence of good moral character. Testimonials from their latest instructors are preferred.

Vaccination. Applicants for admission must present evidence of proper vaccination at a date sufficiently recent to insure protection against smallpox, or be vaccinated upon matriculation.

Hazing Pledge. Each applicant for admission or readmission must sign the following pledge: "I pledge myself on my honor not to encourage or participate in hazing or rushes during my attendance at the University."

SCHOLARSHIP REQUIREMENTS

For Admission without Conditions. For full admission to the College of Mines and Metallurgy fifteen units of high-school credit are required, chosen from the list below, subject to the following restrictions: (1) Three units must be presented in English; two in history, or in history and civics; two in algebra; and one in plane geometry. (2) Not more than four units may be presented in history and civics together. (3) Biology may not be presented by a student who presents either botany or zoology.

For Admission with Conditions. Until further notice, students may be admitted conditionally with only thirteen units.

SUBJECTS AND UNITS ACCEPTED FOR ADMISSION

A unit implies nine months of high-school study of five class periods a week at least forty minutes long.

English, 3 or 4	Natural Sciences:
Social Sciences:	Biology, 1
Ancient and Medieval History, 1	Botany, 1
Modern History, 1	Chemistry, 1
American History, $\frac{1}{2}$ or 1	Introduction to Science, 1
English History, $\frac{1}{2}$ or 1	Physics, 1
Civics, $\frac{1}{2}$ or 1	Physiography, $\frac{1}{2}$
Economics, $\frac{1}{2}$	Physiology and Hygiene, $\frac{1}{2}$
Mathematics:	Zoology, 1
Algebra, 2	Vocational Subjects:
Plane Geometry, 1	Agriculture, $\frac{1}{2}$ —2
Solid Geometry, $\frac{1}{2}$	Bookkeeping, 1
Trigonometry, $\frac{1}{2}$	Commercial Geography, $\frac{1}{2}$
Advanced Arithmetic, $\frac{1}{2}$	Domestic Art, $\frac{1}{2}$ — $1\frac{1}{2}$
Foreign Languages:	Domestic Science, $\frac{1}{2}$ — $1\frac{1}{2}$
Latin, 2, 3, or 4	Drawing, $\frac{1}{2}$ —2
Greek, 2 or 3	Manual Training, $\frac{1}{2}$ —2
German, 2 or 3	Shorthand and Typewriting, 1
French, 2 or 3	Argumentation and Debating, $\frac{1}{2}$
Spanish, 2 or 3	Music, 1

METHODS OF ADMISSION

Admission must be secured in one of two ways: (1) by presenting the necessary credits, or (2) by individual approval.

I. Admission with Credits

Students may obtain credits in three ways, or by a combination of two or more of them, as follows:

(1) **By Diploma.** Graduates of approved schools are credited with the subjects they have completed in which the schools are accredited. In order to determine these credits, they are required to present statements of their work made out by the superintendent or principal on the University's official blank, to be had of the dean of the college. It is of the highest importance that the applicant send this blank, properly filled out, to the dean in advance. Valuable time will be lost if he comes to El Paso without it, and more if he has to send for it after he arrives. Without it he cannot be admitted at all.

No credit is given for work done at an accredited school unless the candidate is a regular graduate of the school.

The University of Texas has no accredited schools outside of Texas, but it will usually accept, for work done in a school in another state, credits granted by the state university of that state; or, in the absence of such an institution, by another institution of recognized standing acquainted with the work of the school in question.

(2) **By State Teacher's Certificate.** Applicants holding a state teacher's certificate based on state examinations will receive credit for eight and a half units if the certificate is a first grade, and twelve and a half if a permanent. In each case the units will be specified in accordance with the subjects taken for the certificate.

(3) **By Examination.** Any or all scholarship requirements may be met by passing the admission examinations.

To secure credit in any subject, the applicant must make a grade not lower than D. In grading examination papers, whatever the subject, account will be taken of the applicant's use of English. Excellence in one subject will not make up for deficiency in another. Credits are not divisible in any subject.

Every natural science examination paper must be accompanied by a laboratory notebook.

Admission examinations are held twice a year, early in May and in the fall.

By agreement between certain coöperating Texas colleges and universities and the Committee on Inspection, Classification, and Accrediting of Texas High Schools, the May series of examinations are given under the direction of the State Department of Education at accredited schools and other approved centers. Application for these examinations should be made to the State Superintendent of Public Instruction, Austin.

The fall examinations are held only at the University and the College of Mines and Metallurgy.

The following are the dates and the order of the September series of admission examinations for 1923:

Monday, September 17: 9 to 12, English; 2 to 6, American History, Ancient and Medieval History, and Civics.

Tuesday, September 18: 9 to 12, English History, Modern History, and Economics; 2 to 6, Algebra and Plane Geometry.

Wednesday, September 19: 9 to 12, French, German, Latin, Spanish, and Bookkeeping; 2 to 6, Agriculture, Biology, Botany, Chemistry, General Science, Physiography, Physiology and Hygiene, Shorthand and Typewriting, and Zoology.

Thursday, September 20: 9 to 12, Solid Geometry, Trigonometry, and Commercial Geography; 2 to 6, Domestic Art, Domestic Science, Physics, and Advanced Arithmetic.

It is strongly urged that applicants desiring to enter the University in September attempt the May examinations. It is permitted to divide the subjects between the spring and fall examination periods, but credits obtained at the spring examinations lapse unless the applicant passes the deferred examinations the following fall; and credits obtained at the fall examinations, if less than the total number required, are not valid later.

II. By Individual Approval

At the discretion of the registrar of the University, an applicant over twenty-one years old may be admitted without examination, on the following conditions:

(1) He must make application on the official blank (to be had of the registrar), giving the information there desired.

(2) He must furnish evidence that he has substantially covered the ground of the units required of other candidates, and that he has sufficient ability and seriousness of purpose to do the work desired with profit to himself and to the satisfaction of the University.

(3) He must show, by the writing of a composition, that he has an adequate command of English.

Applicants are advised to send their applications and credentials in advance of their coming to El Paso.

Admission by individual approval contemplates applicants who have not recently attended school and are not, therefore, in a position to pass the admission examinations.

Students so admitted may register for courses other than freshman courses only with the approval of the dean, given because of evidence of special fitness.

Neglect of work or other evidence of lack of serious purpose on the part of a student thus admitted will cause the withdrawal of the dean's approval, thus severing the student's connection with the University, and preventing his readmission until he has satisfied all admission requirements.

Students admitted by individual approval can not become candidates for degrees until they have satisfied the admission requirements. As to how to remove admission conditions, see the following section.

HOW TO ABSOLVE ADMISSION CONDITIONS

Admission conditions may be removed (1) by taking, with the approval of the dean, the regular admission examinations in subjects not studied by the student in the University; (2) by counting work done in the University. The prescribed admission units must be satisfied by work in the corresponding subjects in the University; the elective admission units may be absolved by any University work. In satisfying admission conditions, a course counts as the equivalent of one and one-half units. Courses used to absolve admission requirements will not count toward a degree. If a student does not satisfy his admission conditions within two years after admission, he must present one additional unit for each year that his conditions remain unsatisfied. Conditions may not be removed by taking admission examinations later than two years after admission. After that time, they may be removed only by work done in the University.

Students admitted by individual approval to English 1 will, on completing that course, be given credit also for three admission units in English. Similarly, students admitted to freshman mathematics will, on completing that course, receive credit also for two admission units in algebra and one in plane geometry. Further, students admitted by individual approval and making, during their first long session, with an average grade of C, not less than thirty credit hours of the regularly prescribed work of the freshman class, will in addition absolve all admission conditions in free elective units.

ADVANCED STANDING

Students from Secondary Schools. Applicants who, in addition to satisfying the admission requirements, wish to obtain advanced standing in any subject, must secure, by examination or otherwise, the consent of the dean of the college.

Students from Other Colleges. A student seeking admission from another college must present: (1) A letter of honorable dismissal; (2) a vaccination certificate; (3) a catalogue of the college from which he comes; (4) a full statement of the work he has done, including the work credited at entrance. This statement must be made out on the University's official blank (to be had of the dean), and must be duly certified by the authorities of the student's college. Much trouble and time will be saved if the blank is filled out and certified in advance of the student's coming to El Paso. Students are not allowed to register until the proper certificates are presented.

All credits given students from other colleges are conditional. If

their work here is of a low grade, the amount of credit given to individual students may be reduced.

Like other applicants for admission, students from other colleges must sign a pledge to do no hazing.

EXPENSES

FEES

Matriculation Fee. Each student will pay at the beginning of each session an annual matriculation fee of ten dollars, until thirty dollars have been paid. If any part of the total amount has been paid in any other branch of the University, that part is not again required in the College of Mines and Metallurgy.

Laboratory Fees. Students who take laboratory courses are required to pay a fee to cover in part the cost of the material consumed. In certain subjects, a deposit also is required to cover breakage of apparatus. Certificates of payment of these fees and deposits must be presented by the students to their instructors before they can be assigned to desks in the laboratories or enrolled in their classes.

The following table shows the fees and deposits due in the several subjects:

LABORATORY FEES AND DEPOSITS

Subject	Fee	Deposit	Total	Subject	Fee	D.	It	Total
Chemistry 1.....	\$10.00	\$ 5.00	\$15.00	Physics	\$ 3.00	\$		\$ 6.00
Chemistry 2.....	12.00	8.00	20.00	Mechanics	3.00	.		6.00
Chemistry 6.....	15.00	5.00	20.00	Field Geology.....	5.00	---		5.00
Chemistry 7.....	5.00	5.00	10.00	Mineralogy	5.00	5		10.00
Chemistry 8.....	5.00	5.00	10.00	Mill Work Course				
Chemistry 9.....	5.00	5.00	10.00	In Ore Testing...	5.00	----		5.00
Drawing	2.00	2.00	4.00	Summer Surveying	2.00	----		2.00

Each student is required to furnish his own drawing instruments, which cost from fifteen to twenty dollars.

In the summer courses in surveying, the student will be required to pay for any damage to instruments arising from causes other than ordinary wear and use, which are covered by the two-dollar laboratory fee.

Diploma Fee. A diploma fee of five dollars is payable not later than March 1 by each candidate for a degree the following May.

Delayed Registration Fee. A student who registers after the last registration day of any semester is required to pay a delayed registration fee of three dollars.

Student Association Fee. The Student Association fee is \$10.00 a year. This fee covers the student activities, social and athletic, and also provides for the school paper, *The Prospector*, which is published by the student body.

Repayment of Fees. If a student is allowed to drop a laboratory course, one-half of the fee will be refunded for each semester not begun. In no case will the fee be returned for a semester the work of which has been begun.

The matriculation fee is not returnable.

The diploma fee will be returned only in case the student withdraws from candidacy for the degree before the diploma is made out. The fee is barely sufficient to cover the cost of the diploma, and, as all undelivered diplomas are destroyed, it must be paid over again if the student makes another application for the degree.

No fee holds over from one year to another.

BOARD AND ROOM

The College of Mines and Metallurgy maintains two dormitories and a dining-hall. Board cost twenty-five dollars a month the past year. The rate for the coming session will be based upon the cost of supplies. The corner rooms rent for eight dollars a month, the other rooms for six dollars. As the demand for dormitory rooms is large, while the number of rooms is limited, it is expected that two students will occupy a room and share the rent between them.

The rooms are heated by hot water, lighted by electricity, and furnished. Each student must provide his own mattress (for single bed), pillows, blankets, and bed linen.

Each student is held responsible for any damage to his room or its contents, whether caused by him or not. A dormitory breakage deposit of five dollars is required, which is returned if no damage is done to the furniture, building, or fixtures.

Board and room rent must be paid in advance on the first day of each month. A fine of fifty cents a day is charged for each day the student is delinquent.

Rooms will be assigned in the order of application, preference being given to students who are occupying rooms during the current session, provided their applications are received before May 31 and accompanied by a deposit equal to one-half the monthly rental of the rooms for which application is made. All new applications must be accompanied by a deposit of three dollars in order to be considered. Rooms thus reserved will be held only until September 29 unless special notice is given of delayed arrival.

REGULATIONS

REGISTRATION

Students are required to register in person for each semester. Those who register after the appointed dates will be required to pay a fine of three dollars.

After the twelfth working day of any semester, students will be allowed to enter only if, in addition to fulfilling the admission requirements, they pass satisfactory examinations upon the back work of the subjects they desire to take.

DEFINITION OF CREDIT

An hour of credit implies one classroom hour a week for one semester. Three hours of laboratory work are counted as equivalent to one hour of recitation or lecture. Thus, a course consisting of three lectures or recitations a week for one semester is rated as a three-credit subject; one consisting of three lectures or recitations and three laboratory hours a week for one semester, as a four-credit subject.

AMOUNT OF WORK

Freshmen may not register for more than eighteen credit hours for each semester; sophomores and juniors, for more than twenty credit hours; seniors, for more than twenty-one credit hours, except by vote of the faculty.

Students who expect to become candidates for a degree may carry not less than twelve credit hours for each semester.

ADDING AND DROPPING COURSES

After his registration for the session, a student may add a subject only with the approval of the dean. No subject may be added, however, after the twelfth working day of any semester.

For weighty cause, a student may drop a subject with the consent of the dean. To drop a subject without permission means to sever one's connection with the University.

On the recommendation of the instructor concerned, approved by the dean, a student may at any time be required to drop a course because of neglect or for lack of preparation.

CLASS ATTENDANCE AND ABSENCES

Absence from Class. Uniform and punctual attendance upon all exercises at which the student is due is strictly required. Absences are sometimes unavoidable, and a reasonable allowance is made for such possibilities. A student, however, who is absent unexcused during any semester from any subject for more than one-tenth of the total number of exercises in that subject, is dropped from the University rolls for the remainder of the session. Late registration and the payment of a delayed registration fee do not exempt a student from accountability for absences before registration.

When dropped from the University rolls for excessive absences in a

particular subject, the student may, unless he obtains the dean's permission to drop the course, gain readmission only by passing a special examination in the subject at a date fixed by the dean and the instructor concerned.

For prolonged absence due to illness, a student may be excused on application to the dean. A statement from the attending physician must be presented as evidence of the student's incapacity.

If a student is compelled to be absent from his work on account of business, he should apply to the dean for temporary withdrawal. No repayment of fees is permissible, but, his instructors being notified, he is not reported absent from his classes. In order to be readmitted to his classes for the remainder of the session, the student must, within two weeks after his return, pass special examinations in all his subjects covering the work missed during his absence. In every case of temporary withdrawal, the parent or guardian is notified.

Absence from Quiz. A student absent from an hour examination or quiz is graded zero on that quiz, unless for urgent reason he is given by the instructor the privilege of taking a postponed examination at a time to be set by the latter.

Tardiness. Serious or repeated tardiness will be considered as equivalent to absence, and reported as such.

Failure to Hand in Themes, Reports, Etc. Themes, reports, etc., not handed in at the time appointed may be received only in case the delay was due to imperative cause satisfactory to the instructor.

EXAMINATIONS

Term Examinations. The object of examinations being primarily not to find out how much the student knows, but to lead him to secure a general view of the whole subject and readiness in the use of it, the faculty has ruled that exemptions from examinations may not be given. To encourage preparation for examination, the faculty has further ruled that during the last seven days of each semester before examinations, no written examination or review shall be given; and all essays, theses, synopses, and the like, must be handed in before this period begins.

In all examinations, account is taken of the student's use of English and of the form of the paper in general, the grade being lowered because of deficiencies in these regards as well as in the subject-matter proper.

Absence from Term Examinations. A student who is compelled to be absent from a term examination on account of sickness or other imperative cause should petition the dean, beforehand if at all possible, for permission to postpone the examination. If this permission is granted, the postponed examination may be taken within a year on any of the dates appointed therefor, provided the student petitions the dean on or before the seventh day preceding the first day of the examination period.

A student absent from a term examination without the dean's excuse is graded F or G, and required to take the term's work over again if he desires credit for it.

Postponed, Advanced Standing, and Condition Examinations.

Postponed and advanced standing examinations and examinations for the removal of conditions are held at the regular examination periods in January and May. Applications for these examinations must be made to the dean on or before the seventh day preceding the first day of the examination period. Conditions received in the second semester may, at the discretion of the dean, be removed by a second examination the following September.

A student who fails to pass a condition examination in any subject forfeits thereby the right to ask for another examination in that subject. Absence from an examination, after once a permit has been granted, will have the same effect as failure, unless the student presents to the dean within a week after the date set for the examination a satisfactory excuse for his absence.

Term Reports. Reports are sent out to parents and guardians at the end of each term for all students. Self-supporting students over twenty-one years of age may receive their reports instead of their parents, if they request it in writing.

GRADES OF SCHOLARSHIP

Grades. The standing of the student in his work is expressed by grades made up from class work and from examinations. There are seven grades: A (excellent), B (good), C (fair), D (pass), E (failure), F (bad failure, with privilege to continue the course), G (the same as F, except that the student may not continue the course). To pass in a course, it is necessary to secure a grade of at least D both on class work and on term examination, considered separately. Grades are given by semesters, but no subject will count toward a degree until credit has been received for all the semesters covered by it.

Mid-Term Reports. About the middle of each semester, reports are sent out for students doing work below the passing grade (D) both to the students themselves and to their parents or guardians.

Effect of a Term Grade of E. A student who fails to pass in a course but makes a grade of E is called "conditioned," and is allowed opportunity to remove the condition by a second examination at the next regular examination period, or the following September, at the discretion of the dean, in case the condition is received in the second semester.

In a subject continuing beyond one semester, the instructor may, by sending to the dean the proper credit notice, raise an E of an earlier semester to D because of good work done in a later semester; but no grade may be altered later than six months after it was handed in, unless further work has been done in the course in the meantime.

Effect of a Term Grade of F. A student who receives a grade of F for any term, whether by reason of poor work, or absence from the term examination without excuse from the dean, may continue the course; but he may not obtain credit for the term in which he failed without *repeating the work of that term in class.*

Effect of a Term Grade of G. A student who receives a grade of G for any term, whether by reason of poor work, or absence from the term examination without excuse from the dean, is dropped from the subject, and must, if he desires to obtain credit for it, take that term's work over again in class.

Higher Work after Failure. If a student makes an F or a G in a course, he may not take up a higher course in the same subject until the course is taken again. If a student makes an E in a course, he may take up a higher course in the same subject only with the written consent of the instructor concerned, approved by the dean.

CLASSIFICATION OF STUDENTS

Students are classified as regular and irregular. Under *Regular Students* are grouped those taking twelve or more hours of work prescribed for a degree. Under *Irregular Students* are grouped those taking less than twelve credit hours.

Regular students are divided into freshmen, sophomores, juniors, and seniors. Until the completion of thirty-five credit hours of prescribed work in addition to the full admission requirements, they are freshmen; then, until seventy credit hours are completed, sophomores; then until one hundred and eight credit hours are completed, juniors; then seniors until graduation.

DISCIPLINE

Students are trusted to conduct themselves properly. If, however, it becomes apparent that any student, by misconduct or by neglect of studies, is doing harm to himself or to others, the faculty will use all appropriate means of discipline. The following penalties may be resorted to: Admonition, probation, suspension, and expulsion.

The penalties mentioned above will not necessarily be inflicted in regular gradation, but any one will be imposed as the circumstances demand.

The University has been remarkably free from such evils as hazing and class rushes; and, in order to insure the continuance of this desirable condition, the faculty has specially forbidden rushes, and announced that students engaging in, instigating, or encouraging them will be liable to suspension.

Probation. Probation is of two kinds, disciplinary and scholastic. It will be for a definite period, during which the student, while still in attendance upon his classes, must show marked improvement in

conduct or in studies, or in both, in default of which his connection with the University will terminate with the period.

A student on probation who absents himself from any class exercise, or neglects any class work, except for reasons considered imperative by the dean, will thereby drop his name from the University rolls for the remainder of the session.

Absences and neglect on the part of such student, not explained to the dean within one day—beforehand, if possible—will be presumed to be without excuse and will effect the dropping above mentioned.

Suspension. Suspension will be for a definite period, during which the student will not be allowed within the University or upon its grounds, and may be required to satisfy special conditions.

Expulsion. Expulsion is the severest penalty, and is final separation from the University. No student, however, will be expelled except after a full hearing and by a vote of the faculty.

REQUIREMENTS FOR DEGREES AND CERTIFICATES

BACHELOR OF SCIENCE IN MINING ENGINEERING

The completion of the following four-year curriculum leads to the degree of Bachelor of Science in Mining Engineering.

First Year

First Semester

SUBJECT AND NUMBER OF HOURS A WEEK	NUMBER OF CREDITS
Algebra	3
Trigonometry	2
English, 3	3
Drawing, 9 hours draughting room	3
Chemistry, 3 lectures, 3 hours laboratory	4
Spanish	3
	—
	18

Second Semester

Trigonometry	} 3	3
Analytical Geometry		
English, 3		3
Drawing, 6 hours draughting room		2
Chemistry, 3 lectures, 6 hours laboratory		5
Spanish		3
Surveying, 2		2
		—
		18

Summer Work in Surveying:

Eight hours a day for four weeks	3
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Second Year

First Semester

SUBJECT AND NUMBER OF HOURS A WEEK	NUMBER OF CREDITS
Calculus	3
Analytical Chemistry, 9 hours laboratory	3
Geology	3
Mineralogy, 2 lectures, 3 hours laboratory	3
Physics, 3 lectures, 3 hours laboratory	4
English	2
	—
	18

Second Semester

Calculus	3
Analytical Chemistry, 9 hours laboratory	3
Geology	3
Mineralogy, 2 lectures, 3 hours laboratory	3
Physics, 3 lectures, 3 hours laboratory	4
English	2
	—
	18

Four Weeks Field Geology 3

Third Year

First Semester

Assaying, 1 lecture, 3 hours laboratory	2
Mining Methods	2
Ore deposits	3
Introductory Metallurgy	3
Applied Mechanics, 4 lectures, 6 hours laboratory	6
Economics	3
	—
	19

Second Semester

Assaying, 1 lecture, 3 hours laboratory	2
Mining Machinery	2
Petrology, 2 lectures, 3 hours laboratory	3
Introductory Metallurgy	3
Mine Surveying, 1 lecture, 3 hours laboratory	2
Economics	3
Railroad Surveying, 1 lecture, 3 hours laboratory	2
Hydraulics	2
	—
	19

Fourth Year**(MINING OPTION)****First Semester**

SUBJECT AND NUMBER OF HOURS A WEEK .	NUMBER OF CREDITS
Ore Dressing, 3 lectures, 3 hours laboratory	4
Leaching, 3 lectures, 3 hours laboratory	4
Management	2
Electrochemistry, 1 lecture, 3 hours laboratory	2
Electricity, 3 lectures, 3 hours laboratory	4
Hygiene and Sanitation	2
	—
	18

Second Semester

Accounting	3
Power Plants	3
Ore Dressing, 2 lectures, 3 hours laboratory	3
Leaching, 2 lectures, 3 hours laboratory	3
Mining Law	2
Mill Design, 3 hours laboratory	1
Coal	2
Hygiene and Sanitation	2
	—
	19

(METALLURGY OPTION)**First Semester**

Lead and Copper	3
Metallurgical Analysis, 6 hours laboratory	2
Leaching, 3 lectures, 6 hours laboratory	5
Mine Management	2
Electricity, 3 lectures, 3 hours laboratory	4
Hygiene and Sanitation	2
	—
	18

Second Semester

Lead and Copper	3
Accounting	3
Leaching, 2 lectures, 9 hours laboratory	5
Power Plants	3
Metallography, 1 lecture, 3 hours laboratory	2
Hygiene and Sanitation	2
	—
	18

(GEOLOGY OPTION)

First Semester

SUBJECT AND NUMBER OF HOURS A WEEK	NUMBER OF CREDITS
Oil and Gas	3
Advanced Geology	3
Paleontology, 3 lectures, 3 hours laboratory.....	4
Microscopic Petrology, 2 lectures, 6 hours laboratory.....	4
Rare Minerals, 1 lecture, 3 hours laboratory.....	2
Hygiene and Sanitation.....	2
	—
	18

Second Semester

Coal	2
Advanced Geology	3
Paleontology, 3 lectures, 3 hours laboratory.....	4
Microscopic Petrology, 2 lectures, 6 hours laboratory.....	4
Rare Minerals, 1 lecture, 3 hours laboratory	2
Hygiene and Sanitation	2
	—
	17

MINING ENGINEER

The degree of Mining Engineer will be conferred upon graduates of the College of Mines and Metallurgy who have done at least two years of successful professional work in mining or metallurgy subsequent to receiving the bachelor's degree and have presented an acceptable thesis.

MINE FOREMAN'S CERTIFICATE

To meet the demand for special instruction for coal-mine foremen, the Mine Foreman's Certificate is offered. This certificate requires one year's attendance and covers fully the proposed course recommended by the State Mining Board. The mathematics is covered by Mathematics A, a special outline of the subject planned specifically for this course. The work in geology, physics, and coal mining is the same as that offered as Geology 1, Physics 1 and 2, and Coal Mining. The course in Economics of Mining will be a briefer course than that offered under that head in "Mining." No special scholastic admission requirements will be demanded, except a common-school education and sufficient maturity. No student will be admitted who does not present a statement signed by former employers certifying to at least two years' actual working experience in a coal mine. This statement will be filed for record with the student's registration card. A certificate will not be issued unless the student, upon the completion of his course, is

twenty-one years of age or over. The cost of the course is the registration fee and the laboratory fee in physics.

COURSE OF INSTRUCTION

(ATTENDANCE REQUIRED)

First Semester

SUBJECT AND NUMBER OF HOURS A WEEK	NUMBER OF CREDITS
Mathematics	3
Geology 1	3
Physics	4
Mining Methods	3
First Aid to the Injured and Mine Rescue Work	1

Second Semester

Mathematics and Surveying	3
Geology 1	3
Physics	3
Coal Mining	3
Economic of Mining (Special Course)	1

PIT BOSS CERTIFICATE

There are in every coal mining section of Texas and the Southwest ambitious men who desire better training to fit them for their occupation as coal miners, but for whom a year at college is practically impossible. For the benefit of these men, the College of Mines and Metallurgy offers a special reading course leading to a Pit Boss Certificate. The subjects covered are practical mathematics, mining methods, mining equipment, transportation methods, mine organization and safety, boilers, engines, elementary economics, etc. On receipt of a dollar and a half as a registration fee, printed instructions will be sent. The student will pay for his own books. As each section of the work is completed, a short set of examination questions and problems will be sent. On completion of the whole course, a final examination will be sent to the student's county superintendent of schools to be taken under his direction. On receipt of the student's answers, with the county superintendent's signed statement that the examination has been properly conducted, the student will be given a Pit Boss Certificate, provided he has correctly answered at least seventy-five per cent of the questions, is at least eighteen years old, and has had at least twelve months in actual coal-mine work. The only preparation necessary to carry on this work successfully is an elementary education; that is, the ability to read and write English easily. A student under eighteen will not be accepted unless he has had one year in high-school work.

COURSE OF INSTRUCTION

(ATTENDANCE NOT REQUIRED)

Practical Mathematics, Palmer, Parts 1, 2, and 3.
Mining Methods and Shaft-Sinking.
Mining Equipment, Management, and Ventilating Equipment.
Boilers and Engines.
Elementary Economics.

COURSES OF INSTRUCTION

CHEMISTRY

PROFESSOR F. H. SEAMON

1. *General Inorganic Chemistry*.—The laws and theories of chemistry, with a study of the chemical elements and their compounds with special reference to their production and industrial uses. A comprehensive course is given in the solution of practical chemical problems. Freshman year; lectures and recitations; three hours, both semesters; six credits.

1a. *Laboratory Course*.—Laboratory processes; preparation and study of the properties of gases; simple inorganic preparations and experiments in general chemistry; chemical problems. Freshman year; one afternoon, first semester; one credit.

1b. *Qualitative Analysis*.—A detailed study of pure salts and of various complex ores and alloys. The student is trained to detect the presence of the more important bases and acids in solids and solutions. Freshman year; two afternoons, including frequent lectures, second semester; two credits.

NOTE.—Courses 1, 1a, and 1b, although listed separately, form one integral course. The laboratory courses must be taken with the class work.

2. *Analytical Chemistry*.—Gravimetric analysis of pure chemical salts; acidimetry and alkalimetry; volumetric analysis covering all classes of work usually done in a mine or smelter laboratory. Prerequisite: Chemistry 1, 1a, and 1b. Sophomore year; three laboratory periods, including frequent lectures, both semesters; six credits.

6. *Assaying*.—The determination of gold, silver, and lead, by furnace methods, in ores and products of mills and smelters. Instruction is given in the sampling of ores. The student is encouraged to work out his own assay charges based upon his knowledge of fundamental principles, aided by a study of typical examples. Prerequisite: Chemistry 2. Junior year; one lecture and one laboratory period, both semesters; four credits.

7. *Chemistry and Mineralogy of the Rare Minerals*.—A course in

advanced chemistry and mineralogy including the occurrence, use, and economic importance of the rare elements. Special attention is given to the study of the minerals of molybdenum, tungsten, uranium, and vanadium. Prerequisite: Chemistry 2. Senior year; one lecture and one laboratory period, both semesters; four credits.

8. *Electrochemical Analysis*. A course designed to give the student a practical knowledge of the methods of analysis and the more important chemical reactions obtained by the use of the electric current. Prerequisite: Chemistry 2. Senior year; one lecture and one laboratory period, first semester; two credits.

9. *Metallurgical Analysis*.—A course in advanced chemical analysis covering the analysis of metals, alloys, fuels, boiler feed water, and flue gases. Prerequisite: Chemistry 2. Senior year; two laboratory periods and frequent lectures, first semester; two credits.

ECONOMICS, ENGLISH, AND HISTORY

ASSOCIATE PROFESSOR DRAKE; ADJUNCT PROFESSOR WINKLER.

Economics

1. *Principles of Economics*.—A study of the principal branches of economic theory and current economic problems. Emphasis is placed upon problems concerning money, banking, trade, labor, taxation, trusts and other combinations, and railroads, and especially upon economic problems connected with the mining industry. Three hours, both semesters; six credits. Associate Professor DRAKE.

2. *Accounting*.—A study of the technic of accounts; analysis of the balance sheet and income statement; a study of costs, charges upon investment, reserves, sinking funds, maintenance, depreciation, salvage values, and similar subjects. Open only to seniors. Three hours, second semester; three credits. Associate Professor DRAKE.

English

1. *Composition and Rhetoric*.—A study of the rhetoric of the whole composition, of the paragraph, and of the sentence, and the analysis of masterpieces of English prose, with abundant practice in writing. Three hours, both semesters; six credits. Associate Professor DRAKE.

2. *English*.—A general survey of English literature from the early Anglo-Saxon period to the present time. This includes a study of masterpieces in both prose and poetry. Original essays are required from students each term. Prerequisite: English 1. Three hours, both semesters; six credits.

3. *Technical Writing*.—A course designed as a preparation for technical writing. The principal object is to train the student in outlining and writing upon technical subjects for private reports and

for publication. Reports upon assigned topics are required. Prerequisite: English 1. Two hours, both semesters; four credits. Associate Professor DRAKE.

History

1. *Ancient History*.—History of Greece from the earliest times to the death of Alexander; the Roman Republic from the earliest times to the Battle of Actium; the Roman Empire from the Battle of Actium to the downfall of the Empire in the west. Three recitations, both semesters; six credits. Adjunct Professor WINKLER.

2. *History of Medieval Europe*.—A general survey of the development of Western Europe from the final division of the Roman Empire in 395, to and including the period of the Renaissance. Special emphasis on the gradual evolution of the civilization of the Germanic people. Lectures and recitations, supplemented by textbooks, correlative reading, individual topics, map drawing, and quizzes. Three recitations, both semesters; six credits. Adjunct Professor WINKLER.

5. *History of the United States*.—A general survey of the history of the United States from the discovery of America to the present. Special attention is paid to movements, their underlying causes, motives, and tendencies. Lectures, discussion of topical reading, and map study; collateral reading and oral and written quizzes. Three recitations, both semesters; six credits. Adjunct Professor WINKLER.

Psychology

1. *Introductory Psychology*.—For students who desire a full course in psychology, and for those who plan subsequently to register for advanced courses in psychology. The various topics of the introductory course are discussed in detail and emphasis is placed upon a general survey of the fields of psychology. Prerequisite: Sophomore standing. Three recitations, both semesters; six credits. Adjunct Professor WINKLER.

Sociology

1. *Principles of Sociology*.—A good basic course in social evolution. Special attention given to fundamental characteristics of society, presents social problems, and tendencies toward solution or adjustment. Collateral reading, helpful magazine articles, lectures, class discussions, special reports, oral and written quizzes. Prerequisite: Economics 1. Three recitations, both semesters; six credits. Adjunct Professor WINKLER.

COLLEGE OF MINES AND METALLURGY
ENGINEERING AND MATHEMATICS

PROFESSOR KIDD; ADJUNCT PROFESSOR NELSON; INSTRUCTOR PEARSON

Drawing

1. *Mechanical Drawing*.—The course includes lettering, geometrical constructions, isometric projection, sketching of machine parts, complete working drawings from sketches and copy, tracing, and blue-printing. Three afternoons, first semester; two afternoons, second semester; five credits. Adjunct Professor NELSON.

Engineering

14. *Physics: Mechanics and Heat*.—The course includes a thorough grounding in kinematics, dynamics, statics, kinetics, properties of matter, thermometry, and expansion. Particular attention is given to composition and resolution of forces, accelerations, and velocities, to simple harmonic motion, and to the moment of inertia. Prerequisite: Mathematics 6 and 7. Three recitations and one laboratory period, first semester; four credits. Instructor PEARSON.

15. *Physics: Heat, Electricity, and Magnetism*.—A continuation of Physics 14. The subjects treated are calorimetry, heat and work, change of state, vaporization, condensation of gases, radiation, magnetism, the magnetic field, magnetic induction, electrostatics, electrodynamics, and radioactivity. Prerequisite: Mathematics 6 and 7. Three recitations and one laboratory period, second semester; four credits. Instructor PEARSON.

3. *Plane Surveying*.—The theory of plane surveying, including the care and adjustment of instruments; land surveying; traverses; leveling; determinations for meridian; topographic surveying; mapping; the different systems of note keeping; and the usual computations used in plane surveying. Prerequisite: Mathematics 6. Two hours, second semester; two credits. Adjunct Professor NELSON.

4. *Field Surveying*.—A practical field course covering the topics outlined in the preceding course. Accurate and rapid work will be insisted upon. Prerequisite: Engineering 3. Eight hours a day during September; three credits. Adjunct Professor NELSON.

5. *Mine Surveying*.—Underground surveying, mapping of underground connections, surface surveying in connection with mineral claims, and all ordinary surveying operations that the mining engineer may be called upon to perform. Prerequisite: Engineering 4. One hour and one laboratory period, second semester; two credits. Adjunct Professor NELSON.

6. *A. Thermodynamics*.—A study of the fundamental equations of gases, and their application to the steam engine; the heating values of different fuels; the practical construction and operation of

steam boilers; boiler feed pumps; methods of firing boilers; different types of steam engines as regards speed, valves, steam consumption, comparative cost, and relative economy; actual adjustment of valves, and determination of horsepower by the use of the indicator; steam turbines; and a large number of practical problems. Prerequisite: Mathematics 8. Three hours, second semester; three credits. Professor KIDD.

8. A. *Hydraulics*.—A brief course in hydrostatics; fluids in motion; flow of liquids through pipes, orifices, and over weirs; fluid friction and loss of head; Bernoulli's theorem; flow of water in canals and rivers; Kutter's formula; and graphical methods. Prerequisite: Mathematics 8 and Engineering 14 and 15. Two hours, second semester; two credits. Professor KIDD.

9. A. *Applied Mechanics*.—Center of gravity, moment of inertia, radius of gyration; bending moments; shear; torsion; resilience; flexure of beams; theory of long columns; strength of materials. The funicular polygon; moment diagram; shear diagram; determination of stresses in various types of roof and bridge trusses; completed designs in steel and timber; comparisons as to weight and cost. Prerequisite: Drawing 1 and Mathematics 8. Four recitations and two laboratory periods, first semester; six credits. Professor KIDD.

12. A. *Direct and Alternating Currents*.—Theory of direct and alternating current circuits and machinery; comparisons of direct with alternating current for various uses in mining, metallurgical, and electrochemical work. Prerequisite: Mathematics 8 and Engineering 15. Three recitations and one laboratory period, first semester; four credits. Professor KIDD.

13. A. *Railway Surveying*.—Exercises in simple, reverse, transition curves; turn-outs; cross-sections; and estimates. Prerequisite: Engineering 4. One recitation and one laboratory period, second semester; two credits. Professor KIDD.

Mathematics

A. *Solid Geometry*.—A course in solid geometry for students deficient in entrance credits. Three hours, first semester; one-half unit entrance credit. Instructor PEARSON.

5. *College Algebra*.—A rapid review of quadratic equations; radical expressions; logarithms; choice; chance; series; the binomial theorem; and the theory of limits. Three hours, first semester; three credits. Instructor PEARSON.

6. *Plane Trigonometry*.—The general formulas of plane trigonometry; inverse functions; identities; trigonometric equations; goniometry; solution of triangles; and proficiency in the use of the tables. Two hours, first semester, and one hour, second semester; three credits. Adjunct Professor NELSON.

7. *Analytic Geometry*.—Cartesian coördinates of the point; polar

coördinates; graphs of algebraic and transcendental functions; loci in general; and a careful consideration of the plane curves. Prerequisite: Mathematics 6. Two hours, second semester; two credits. Instructor PEARSON.

3. *Calculus*.—In differential calculus, special attention is given to the derivation of formulas and to the application of derivatives to the solution of problems in maxima, minima, rates, velocity, acceleration, and geometrical applications. The work in integral calculus drills the student in the integration of forms occurring in mechanics and physics; in evaluating areas, moments, moments of inertia, and volumes, in finding the center of gravity and center of stress; and in the derivation and application of the fundamental formulas of hydrostatics and hydraulics. Prerequisite: Mathematics 7. Three hours, both semesters; six credits. Professor KING.

GEOLOGY AND MINING

PROFESSOR W. H. SEAMON; ADJUNCT PROFESSOR NELSON;
LECTURER JENNESS

Geology

1. *Physical Geology*.—A careful study of the facts and principles of dynamic and structural geology. Prerequisite: Chemistry 1 and Physics 1. Three hours, first semester; three credits. Adjunct Professor NELSON.

2. *Historical Geology*.—The history of the earth as preserved in its strata, with elementary instruction in geologic mapping and making geological sections. Prerequisite: Physical Geology 1. Three hours and three afternoons during second semester; three credits. Adjunct Professor NELSON.

3. *Field Geology*.—A summer course lasting four weeks is given each year during the month of September. A camp at some suitable place is selected and the area is carefully mapped and all of the geological features marked. Plane tables, transits, and the Army Sketch Boards are used in mapping. Students provide their own bedding and bear their proportion of the camp expenses for food and transportation. Last year's camp was conducted at a cost of one dollar a day, but the expense for railway transportation is not included as it varied with each individual student. This course is required of all candidates for a degree who have credits in Geology 1 and 2 and Mineralogy 5 and 6; three credits.

4. *Ore Deposits*.—An exhaustive study of the occurrence and origin of all of the useful deposits of gold, silver, lead, copper, zinc, tin, iron, nitrates, salts, gypsum, clays, cement materials, coal, petroleum, and natural gas is made. Prerequisite: Geology 1 and 2 and Mineralogy 5 and 6. Three hours, first semester; three credits.

5. *Mineralogy*.—This course is designed to familiarize the student with all of the ore minerals and the most common rock making minerals. Only the elements of crystallography are taught, but much attention is given to the study of descriptive mineralogy and the frequent and regular handling of minerals. Prerequisite: Chemistry 1, 1a, and 1b. Two hours, both semesters; four credits.

6. *Determinative Mineralogy*.—Each student is required to determine the species of two hundred different and important minerals using streak plate, scale of hardness, and the ordinary blowpipe tests employed in such work. This course must be taken in conjunction with Mineralogy 5. Three hours of laboratory work, both semesters; two credits.

7. *Petrology*.—The design is to qualify the student to recognize in the field the important rocks connected with ore deposits and their chief identification minerals so far as that can be done with the limited testing facilities available on such occasions. The student handles a large and varied collection of type specimens in connection with the lecture work on descriptive petrology. Some knowledge of the methods employed in petrography is secured by a study of a collection of 150 thin sections of type rocks with a microscope, and the student is required to make at least one good thin section of a rock specimen for study under microscope. Prerequisite: Chemistry 1, 1a, 1b, and Mineralogy 5 and 6. Two recitations and one laboratory period, second semester; three credits.

8. *Petrography*.—This course and the two following, 9 and 10, are open to those taking the Geology Option in the senior year of the work. Petrography is gone into minutely with the use of the microscope in the study of rocks. Lectures twice a week and laboratory one afternoon a week, both semesters; six credits.

9. *Advanced Geology*.—Intensive study of structural and historical geology. Prerequisite: Preceding courses 1 to 7 inclusive. Three lectures each week, both semesters; six credits.

10. *Paleontology*.—Study of fossil plants and animals by lectures and laboratory work. Drawing of fossil specimens. After a general course is completed, students are assigned special groups of fossils which they take up in minute detail. Three lectures and one laboratory period each week, both semesters; eight credits.

Mining

1. *Mining Methods*.—Prospecting, exploration, development, exploitation, explosives, breaking ground, drifting, stoping, timbering, drainage, and ventilation of mines, metal and coal. Prerequisite: Completion of courses in chemistry, physics, mineralogy, and geology. Two hours, first semester; two credits. Adjunct Professor NELSON.

2. *Mining Machinery*.—The methods employed in rock and placer mining are studied with reference to the various forms of machines

employed in such operations. Prerequisite: Mining 1. Two hours, second semester; two credits. Adjunct Professor NELSON.

3. *Coal Mining*.—The extraction, cleaning, and marketing of coal and the manufacture of coke and collection of all the by-products are considered. Prerequisite: Mining 1. Two hours, second semester; two credits.

4. *Oil and Gas Mining*.—This course is an exhaustive study of the origin, distribution, migration, and accumulation of oil and gas. The methods of locating oil and gas wells, the drilling of same, bringing wells in, their management; piping, transportation, and refining of oil are also considered; marketing and valuation of oil properties are studied; the possibilities of development in utilization of oil shales are considered. Prerequisite: Geology 1, 2, and 3. Three hours, first semester; three credits.

5. *Practice Mine*.—Practical instruction in driving tunnel, sinking shaft, use of machine drill, timbering, and use of explosives is given on the school campus. The course must be taken in conjunction with Mining 1 and 2, and is given one afternoon a week during the second semester; one credit.

6. *Management*.—Mine examination, sampling, reporting, welfare, financing, and other interesting problems are considered in a lecture course given only to students of senior standing. Two hours, first semester; two credits.

7. *Mining Law*.—The principles governing contracts, liabilities of mine operators, compensation and insurance of workmen, and the laws and court decisions of the United States, Texas, and Mexico, so far as they relate to locations and acquirement of titles to mines are carefully considered in a course of lectures given to seniors. One hour, second semester; one credit.

10. *Hygiene and Sanitation*.—Lectures and recitations. Prevention of communicable diseases, personal hygiene, public hygiene, food, air, water, soil, ventilation and heating, sewage disposal, garbage disposal, disinfection, camp sanitation, mine sanitation, prevention of industrial diseases. The course is supplemented by field work in sanitary surveys, and drawings of apparatus. The course also includes work in first aid and rescue work. Open to juniors. Two hours, both semesters; four credits. Lecturer JENNESS.

METALLURGY

PROFESSOR *WORRELL; ACTING PROFESSOR MCCART

1. *General Metallurgy*.—An introductory course covering a description of the various processes for treating all the metals with calculation of slags and furnace charges. Prerequisite: Chemistry 2. Three hours, three times a week, both semesters; six credits.

*Absent on leave from December 1, 1922, to June 1, 1923.

2. *Metallurgy of Leaching Processes*.—A study of the chemical and physical properties of the precious metals and of such of their compounds as are of importance in connection with the leaching processes; the cyanide process; chlorination; hyposulphite leaching and the Russell process, etc. Prerequisite: Chemistry 2. Three lectures and one laboratory period, first semester; two lectures and one laboratory period, second semester; seven credits.

NOTE.—The course in assaying must either precede Metallurgy 1 and 2, or be taken at the same time.

3. *Ore Dressing and Milling*.—A study of the principles of amalgamation, concentration, and ore dressing. Three lectures and one laboratory period, first semester; two lectures and one laboratory period, second semester; seven credits.

4. *Mill Design*.—A course in laying out flow sheets and in designing plants from data obtained in the preceding course. Lectures and laboratory, second semester; one credit.

5. *Metallurgy of Lead and Copper*.—This and the following course are for students taking the Metallurgy Option. The metallurgy of lead and copper are taken up in minute detail. Drawing of furnaces and calculations for building furnaces are made. Lectures three times a week, both semesters; six credits.

6. *Metallography*.—The microscopic study of alloys and metals is carefully made. One lecture and one laboratory period, second semester; two credits.

MODERN LANGUAGES

ADJUNCT PROFESSOR HENRY

French

1. *Elementary French*.—The essentials of grammar, with exercises in speaking and writing. Reading of easy modern stories and plays. Three hours, both semesters; six credits.

2. *Second-Year French*.—Rapid reading of modern fiction and drama, with practice in speaking. Three hours, both semesters; six credits.

German

1. *Elementary German*.—Grammar, reading, and writing of easy German. Three hours, both semesters; six credits.

2. *Second-Year German*.—A continuation of the work in German I. Three hours, both semesters; six credits.

Spanish

1. *Practical Spanish*.—Drill in speaking, pronunciation, and verb forms. Particular stress is laid upon ordinary conversation. Three hours, both semesters; six credits.

2. *Second-Year Spanish*.—Rapid reading of modern fiction and drama, with practice in speaking. The reading of one modern novel each month is required. Three hours, both semesters; six credits.

ORE TESTS, ASSAYS, AND ANALYSES

ORE TESTING MILL

An appropriation was made by the Thirty-fourth Legislature for the erection of a mill for ore-treating at the College of Mines and Metallurgy. This mill is now completed. The construction has followed a definite idea, that idea being a mill for continuous operation and flow of ore as far as possible. The basis of capacity is two hundred pounds of ore an hour, and lots of less than a thousand pounds will not be treated. No "miniature plants" have been installed, nor any machine whose normal capacity under full loads is in excess of two hundred and fifty pounds an hour.

MILL RUN TESTS ON ORE

Mill run tests on ore will be made free of charge to mine owners desiring tests for process of treatment, regardless of the location of the mine, whether within or without Texas. The mine owner will be required to prepay all freight charges and the cost of the necessary assays. This work will be done by students under the personal direction of the professors in charge of the work, and will be carefully checked to insure that the work is accurate for the lot tested. Beyond this, the college can assume no responsibility. It is the function of the shipper to see to it that the lot shipped for treatment is a representative or average sample of his ore body. If he fails to do this, the test will be worthless, except for purposes of student instruction. All ore shipped to the College of Mines and Metallurgy must be regarded as a gift to the college, and becomes the property of the college when it enters the mill building. The shipper will be expected to sign a statement that he has a body of ore developed of sufficient size to justify a treatment process test. The purpose of the work is to give instruction to students, to assist in the development of the Southwest, and help to prevent the installation of processes not adapted to the ore treated. No mill runs will be made during June, July, August, or September.

ANALYSES OF ORES

The College of Mines and Metallurgy has no desire to undertake analyses of ores in competition with professional assayers. Those who for special reasons wish their work to be done at the school should write to the dean for a statement of the conditions under

which this is possible. Control work and sampling for ore shippers to the smelter will not be undertaken. *Inquiries about coal should be sent to the Division of Economic Geology, about water to the Division of Industrial Chemistry, of the Bureau of Economic Geology and Technology, University of Texas, Austin.*

Identification, i.e., information as to what a mineral is, is made free of charge, regardless of the nature of the mineral or from what state it comes. All samples or specimens sent to the college become its property, and will either be kept or thrown away, at the discretion of the authorities of the school. Supposed gems or precious stones should be sent for identification or valuation, not to the College of Mines and Metallurgy, but to a jeweler or a lapidary.

DEGREES CONFERRED IN 1922

Mining Engineer

Thomas Clements
Thomas Adams Doxey, Jr.
Frederick Lewis Fox
Nathan K. Karchmer
Ewald Kipp, Jr.

Albert Elmslie Millar
Gordon McCulloch Smith
Herbert Carroll Vacher
Bernardo Villegas

REGISTER OF STUDENTS

Long Session of 1922-1923

Backstrom, Russell E.....	El Paso	Jones, Clifford R.....	El Paso
Balassa, C. E.....	Dallas	Kelly, Anne Word.....	El Paso
Baldwin, E. B.....	Mineral Wells	Kelly, Charlee.....	El Paso
Barton, Charles E.....	El Campo	Kennedy, Jack Patton....	El Paso
Beauchamp, Arzie.....	El Paso	Kidd, Robert L.....	Bristow, Okla.
Beck, H. H.....	Minden, La.	Lee, Wilfred.....	Henderson
Bennett, Eugene . . .	Stephenville	McGaw, Delvin....	Hastings, Neb.
Berry, Dudley M.....	Austin	McLean, George D.....	El Paso
Binford, William.....	El Paso	Maese, Robert H.....	El Paso
Brown, Turk	Gatesville	Markgraff, Ermen.....	El Paso
Bull, Alexander.....	Gatesville	Miller, William L....	San Antonio
Burbridge, C. E.....	Canutillo	Mueller, Emil J.....	Gerald, Mo.
Canon, Roscoe H.....	Shiner	Nelson, Mrs. H. P.....	Greenville
Cheavens, John H.....	El Paso	Nelson, Jack.....	Greenville
Coffey, Bonner L.....	Comstock	Newcomb, Robert F.....	
Comancho, Jose F.....	El Paso		Sapulpa, Okla.
Compton, H. W.....	San Angelo	O'Keefe, Theresa.....	El Paso
Cooney, Dan C.....	Roswell, N. M.	Olsen, H. V.....	Corpus Christi
Crosby, Ralph	El Paso	Perrenot, Preston.....	El Paso
Culligan, Mary Hayes....	El Paso	Preston, Eleanor.....	El Paso
Curd, Mary Anna.....	El Paso	Price, John Fred.....	El Paso
Dale, Floyd.....	Grinnell, Iowa	Ragsdale, J. G.....	El Paso
DeWitt, D. C.....	Sayre, Penn.	Risacher, Felix....	Pittsburgh, Pa.
Dickinson, William E.....	Rusk	Robinson, Lewis.....	Canutillo
Donaldson, Homer F.....		Russel, Willard L....	Hallettsville
	Carrizozo, N. M.	Schultz, Rudolph G....	Houston
Edmondson, Cyril.....	El Paso	Seamon, W. H., Jr.....	El Paso
Emert, Amost T.....	El Paso	Shipley, J. J.....	Terrell
Evans, Arthur M.....	Uvalde	Skidmore, Charles A....	El Paso
Falcone, Zelwood.....	Dallas	Spence, Elizabeth.....	El Paso
Falkenhagen, Hodge....	Beaumont	Spence, Joe	Carrizozo, N. M.
Finch, Braden.....	Memphis, Tenn.	Spence, Margaret.....	El Paso
Foster, Justin	El Paso	Springer, Lewis R.....	El Paso
Frazier, Dillon S.....	Dallas	Stover, Cleve A.....	Smithville
Fry, Nellie.....	El Paso	Summers, Lloyd A.....	El Paso
Gant, Leslie.....	Clovis, N. M.	Temple, Carl E.....	Port Arthur
Gardon, LeRoy.....	El Paso	Tharp, Webster J.....	Houston
Goodman, Ruth.....	El Paso	Thomas, Eugene McR....	El Paso
Gould, James N.....	El Paso	Thornton, C. C.	Liberty
Grady, Annie.....	El Paso	Towner, Milton.....	El Paso
Haigh, Berte R.....		Underwood, Dale	
	Los Angeles, Calif.		Georgetown, Ill.
Hair, W. W., Jr.....	Temple	Vance, Jimmie.....	El Paso
Hardy, J. Kenneth.....	El Paso	Ward, Henry.....	Deming, N. M.
Harris, John Lee.....	Dublin	Wheatley, Arthur C.....	El Paso
Haynie, Harold.....	Smithville	Wheatley, Emmie	El Paso
Hendricks, Sam D.....	Mansfield	White, Thomas L.....	Bartlett
Henning, Harris.....	El Paso	Wilhelmi, Fred A....	San Antonio
Holford, J. C.....	El Paso	Winterburn, Read	Fort Bliss
Irby, W. W.....	El Paso	Woodside, Tom J.....	El Paso
Jensen, Laurence.....	El Paso	Wynn, George	El Paso
Johnson, Tom.....	El Paso	Yanez, Jose R.....	San Antonio
Jones, Alice.....	El Paso		