

*First section of book*

# REGISTER

OF

## International Correspondence Schools

Containing names and addresses of 107,239 students who  
have completed their courses or have made  
considerable progress therein, with  
an explanation of the

I. C. S. System of Instruction by Mail

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THIRD EDITION

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International  
Correspondence Schools

International Textbook Co., Props.  
SCRANTON, PA.

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## Preface

THE present, or third, edition of the I. C. S. Register contains the names and addresses of 107,239 students who have made what we regard as satisfactory progress in their studies. The conditions governing the admission of any student to this list are as follows: The student must have completed at least one of the technical subjects of his course or ten drawing plates, if his course includes drawing; for other courses, the student must have done work equivalent to completing about one-third of the course.

The compilation of this list was begun June 14, 1907, and was finished August 19, 1907. The average number of students on our rolls during that period—not counting students taking single subjects, those who do not wish their names published, etc.—was 601,800; hence, the percentage of students whose names are here given is 17.82. We view this record with pride, and it is gratifying to note that the percentage of students who are qualifying for admission to this Register is constantly increasing. The percentage for the first edition, which was compiled between January 18, 1904, and March 17, 1904, was 14.42; consequently, there has been a gain of 3.38 per cent. in three years and five months.

Notwithstanding the expense of publication and the vast amount of labor involved in its compilation, we hope to issue this register biennially. We trust that forthcoming editions will exhibit the same relative increase in size as in this and preceding editions.

It may not be out of place here to explain the manner in which our Schools are conducted. Ordinary textbooks used in schools and colleges are not suitable for purposes of correspondence instruction. Such textbooks cannot be used for this purpose for several reasons, among which are: The majority of them are intended to be studied with the aid of a teacher. They cover a great deal more ground than is necessary for any of the special courses we offer. Again, the ordinary textbooks are usually too theoretical, and they demand too great a knowledge of mathematics and other subjects on the part of a student for us to use them in connection with our system of teaching. For these reasons and others we have prepared our own textbooks, and have adapted them especially to the courses in which they are used. To make it easier for the student when studying them, they have been divided into a large number of small parts, which we issue to the student in pamphlet form, and which we call Instruction Papers.

The Instruction Papers contain on an average about 50 pages each, although many of them have a smaller number of pages than this, and some exceed this considerably. At the end of each Instruction Paper, except in a few cases in which drawing or some allied subject is treated, we print a list of questions under the heading "Examination Questions."

When a student enrolls we send him the first and second Instruction Papers in the order of study, and if he lives a great distance from us we may send him four or five. With these Instruction Papers we send full directions for studying them and for answering the questions at their end.

Every rule and formula is illustrated by one or more examples immediately following it, and whenever possible these examples relate to matters with which the student is supposed to be familiar or to practical matters concerning which the course treats. At frequent intervals, examples for practice are given. The student is directed to study thoroughly the first Instruction Paper, and is advised to work all the examples for practice. If he meets with any difficulty that he cannot overcome, he is urged to write to the Schools for information and assistance. He is requested at the same time to send us his work on the problem as far as he can carry it, so that we can

view the matter from his standpoint. We will give him all the assistance we possibly can, and when he has finally completed the study of the paper, and thinks that he understands it, he writes out the answers to the Examination Questions and forwards his work to us for examination and criticism. While this latter is being done the student takes up the second paper, and when we return his work on the first paper we send with it the third paper. By this means the student always has one or more Instruction Papers on hand to study, and he loses no time on account of any delay in the mails. The student proceeds in this manner until he has finished the course. We render him all the assistance that he needs, and even explain questions and problems given under the head of Examination Questions, if requested.

Any student that obtains a mark of 90 per cent. on his work is passed to the next subject. When a student has completed the course in this manner he is sent a list of questions covering the entire course of study; no answers are given to these questions and the student is given no assistance in answering them. We have no fixed percentage for passing the student on the final examination, judging whether or not he ought to be allowed to pass on the general character of his work. If we deem it inadvisable to pass the student we inform him to this effect, and direct him to restudy particularly certain portions of the course, concerning which he is deficient. Later, when we think that he has the necessary knowledge, we send him another set of Examination Questions, and if he answers these satisfactorily, we give him a Diploma or Certificate of Proficiency, as the case may be.

If a student has great difficulty in studying any particular subject in the regular manner, we give his case particular attention. We arrange matters so that his work always goes to the same person for correction and so that this person answers all letters or communications that the student sends us regarding his work. If necessary, he is directed to study a few pages of a paper, and then requested to answer certain questions that are sent to him, but which are not included in the paper. He then studies another section of the paper, and answers another set of questions, and so on until he completes the subject. Every possible pains is taken to carry the student through his course, and every encouragement that ingenuity can devise is extended to him.

A few words in regard to the scope of our courses will not be out of place here. Our courses are all prepared from a utilitarian standpoint; that is, it is always kept in view that the reason for the student taking one of our courses is that he desires to put the knowledge obtained into immediate practical use. We are not aiming to train the mind, but to give the student such information regarding the principles, theory, and practice as he can use in connection with the position he is aiming to fill. As a consequence, only so much of any particular subject is given as is necessary to meet the requirements for the course in which the subject is treated. Hence, in some courses the same subject is treated very fully, while for other courses the treatment is greatly abbreviated. In all cases we have attempted to cut down the treatment of the mathematical subjects until it covered only so much as was absolutely necessary for the student to know in order to understand the papers that followed. In certain cases, however, the treatment is very full and complete, depending on the purpose for which the paper is intended to be used. For example, the arithmetic used in our School of Commerce covers as much ground as that used in any Business College. Our papers entitled Advanced Algebra cover the subject more extensively than the textbooks generally used in colleges. In preparing our various papers on mechanics we have followed the same general plan as was adopted for our papers on mathematics.

What we term our technical papers may be divided into two classes—those that deal with designing, and those that deal with running and repairing. In either case, the papers are as a rule very thorough and complete. In many cases the subjects are covered more fully, from the standpoint from which they are written, than in any other treatises on the same subjects. In this connection we call attention particularly to our treatment of the subjects of Electric Railways, Interior Wiring, Elevators, our several courses in Shop Practice, etc. It is for this reason, and also because of the simplicity of treatment, that a great many of our students are college graduates, and some of them have taken such of our courses as correspond most nearly with the ones that they pursued at college.

As we previously stated, our textbooks are prepared by the members of our faculty, assisted by writers permanently engaged with us. Frequently, however, the original manuscript is prepared by an expert not connected with us, the work being done under contract. In all such cases the manuscript after being received by us is thoroughly revised, edited, and in some cases rewritten, so as to make it suitable in every way for our courses. Again, our textbooks are subjected to frequent revision; in some instances the entire course is revised, or sometimes wholly rewritten; in other cases only a single paper may be revised or rewritten; but in any case we are greatly assisted in this work by the criticisms of our students, and the difficulties they encounter when studying, as revealed by their work.

INTERNATIONAL CORRESPONDENCE SCHOOLS



## Notice

Since the persons who enroll in the International Correspondence Schools are, as a rule, young men between the ages of 23 and 27 years, and are just beginning their business careers, changes of residence are very common among them. It also very frequently happens that a student changes his address without notifying us for a long time thereafter. Consequently, many of the students mentioned herein have, undoubtedly, different addresses from that on our records at the time this list was prepared (June 14, 1907, to August 19, 1907) or have changed them subsequently. Nevertheless, they lived at the addresses given at some period of time, while pursuing their studies, as can be demonstrated by a call at (or a letter written to) the addresses herein given.

INTERNATIONAL CORRESPONDENCE SCHOOLS

## Personal Statement

It is inevitable that a book of this kind should contain apparently many mistakes. Several of our Representatives have stated that they knew personally of students whose names are not in the book, but which ought to be there; also, that some names have not been spelled rightly and that some addresses were wrong. I know personally of at least one student whose address was wrong in the first edition—the mistake being discovered only after the book was printed. The facts are these: The student removed from the state of New York into the state of New Jersey several years before, and after his removal he never sent in any work or notified us of the change in his address. Hence, while his name was in the book, it could not be found, unless his former address was known.

We take every possible precaution to keep our files correct in the matter of spelling the students' names, and any errors in this respect are generally due to the students' signatures not being plain. Our Representatives could assist us greatly if they would write the names of all students whose signatures are not plain on the enrolment blank, in such a manner that the names could not be misunderstood. Several thousand students have become eligible for inclusion in the book since the names were last taken off.

**A large proportion of our students complete Arithmetic and perhaps one or more of the other preliminary subjects. Having acquired the habit of studying and not desiring to spend the time necessary to write out their answers to the Examination Questions, they stop sending in their work, but still keep up their studies, using for this purpose their Bound Volumes. Of course the work of such students does not appear on our records, and their names are not included in this book.**

In conclusion, we ask every person who receives a copy of this book to read the Preface and very carefully pages xiii-xiv. *If you find any errors in this book, please notify me personally, so that in future editions such errors will not be perpetuated.*

Very truly yours,

J. J. CLARK,

Manager Textbook Department

July 1, 1908

## How to Use This List

**N**AMES and addresses of the students are arranged in the following manner:

The first column gives the name of the student and the last two figures of the year in which he was enrolled. The second column gives his address, the third column indicates the course taken, and the fourth column shows the number of subjects and drawing plates he has completed, and also whether he has received a certificate of proficiency or a diploma. In those cases in which there are ten or more students whose names are given on this list in one town or city, the name of the town or city is printed in bold-face type over the second column. It is then followed by the name of the county in SMALL CAPS. When the number of students is less than ten in any one town or city, the name of the town or city in which the student resides is printed first, and is followed by the street and number, if any, and followed again by the name of the county printed in SMALL CAPS. The name of the state, or country in case of foreign countries, is printed at the top of each page, when practicable, and in the case of the Dominion of Canada, it is followed by the name of the province. The cities and towns are then arranged alphabetically according to the states or provinces, and can be readily located as soon as the state or province has been found.

In explanation of the third column, it may be stated that in order to distinguish our students and to tell in all cases what course each is taking, whether it is a revised course or an old course, etc., we give each student what we call a "class letter," and also an identification number.

This class letter is usually limited to one or two letters, but may, in a few cases, consist of three letters. These class letters and numbers are given in the third column, and are followed in the fourth column by abbreviations indicating the number of subjects completed, the number of drawing plates completed, and whether the student has a diploma or certificate of proficiency. The number of subjects is indicated by the number preceding the letter S. The number of plates is indicated by the number preceding the letter P. If the student has a diploma, the preceding abbreviations are followed by the letter D, and if he has a certificate of proficiency, the letter C is used instead of D. There is really very little difference between our diploma and our certificate of proficiency. The diploma we reserve for the longer and more difficult courses, and the certificate of proficiency is issued to students that have completed single subjects or short courses.

In many cases Instruction Papers are printed in several parts under the same title. In all such cases the subject has been regarded as a single paper, except in a few instances where this was inadvisable. For instance, our course in Complete Advertising is comprised in thirteen papers under the general title of Retail Advertising, and identified as Retail Advertising, Part 1, Part 2, and so on to Retail Advertising, Part 13. For the purpose of this compilation we have assigned a number of new titles to these papers, so as to make the course appear to consist of more than one subject, as it really does. This has also been done in the case of one or two other courses.

In case it is desired to look up in the large volume the record of any particular student, as, for example, the record of E. E. Appel, 171 Manton St., Pittsburg, Pa., we look in the Index to States, printed on the page following the title page, for Pennsylvania, and in its regular alphabetical order find the section number and number of the first page of the state in this section. The section number is placed at the top of each page, on the head line, opposite the page number; to distinguish it from the page number it is preceded by the printers' section mark (§). Consequently, a reference like § 2, page 117 (the number of the section and first page of the state of Pennsylvania) is found by looking along the inside edges of the headlines until § 2 is found, and then through § 2 until page 117 is found. This

directory, for the convenience of our Representatives, is also published in five small volumes; each volume has its own section number applied to all the states it contains. Consequently, when consulting one of the small volumes, the section number may be disregarded; simply find from the Index to States printed on the second cover page on what page the state begins. Having found the state, we then find Pittsburg and the student's name, opposite which is, in the third column, R 2657, and in the fourth column, 18S, 25P, D. The letter D, as before stated, signifies that this student has completed his course, but if it is desired to know what subjects are included in the course, refer to the index immediately following this explanation, and look for R in the left-hand column. It is there seen that R signifies the Railroad Engineering Course, and that the list of subjects included in this course is given on page 10.

It will be noticed that the page numbers in this list are printed in Italics, to distinguish them from page numbers in the general list. Referring then to page 10, there will be found under the heading Railroad Engineering the list of subjects included in the course. The twenty-five drawing plates referred to as completed are included in the subjects of Geometrical Drawing, Mechanical Drawing, and Mapping. Under the list of subjects included in this course will be found a note stating that Formulas is not sent to students taking Algebra directly after Arithmetic. This note was placed here for the reason that some of the students in the Railroad Engineering Course complete both subjects and others only one. Hence, while both classes of students receive a diploma, one class studies one subject less than the other class. In a few cases, it will be noticed that the name of the same student appears twice. This is because he has taken two separate courses. In all cases in which plates are drawn in connection with the study of a subject, the number of plates required to be drawn follows the title of the subject.

In arranging the names of the subjects forming the various courses, these subjects have been placed in the order in which the student usually studies them. In some cases students have been permitted to study subjects outside of the regular order, when this would not interfere with their successfully completing their courses. Some courses have been abolished and others substituted for them. Such courses are placed at the end of the list.

In a few cases, the class letters printed differ in some respects from the class letters in regular use. It has been necessary to change these letters, for the reason that formerly we sometimes used the same class letter for several courses. For instance, all the courses included in our School of Steam Engineering were originally designated by the class letter H. We have added to this letter one or more other letters so as to identify the course completely.

The list does not include students who take only one subject, as, for example, the subject of arithmetic, or algebra, or spelling, etc.; it also does not include the names of students who have requested us not to make their names and addresses public, nor those whose record cards are marked "Dead."

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TO

## LIST OF SUBJECTS

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The number opposite each class letter refers to the page on which the list of subjects of the Course represented by the class letter is given.  
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# LIST OF SUBJECTS

## INCLUDED IN THE

# COURSES OF INSTRUCTION

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## ACTIVE COURSES

### Complete Architectural—A C; A

<p>Arithmetic Formulas Geometry and Mensuration Geometrical Drawing, 9 P. Architectural Drawing, 12 P. Ornamental Drawing, 6 P. Advanced Architectural Drawing, 18 P. (10 Plates optional) Masonry Carpentry Joinery Stair Building Ornamental Ironwork</p>	<p>Roofing Sheet-Metal Work Electric-Light Wiring and Bellwork Plumbing and Gas-Fitting Heating and Ventilation Painting and Decorating Estimating and Calculating Quantities History of Architecture Architectural Design Specifications Building Superintendence Contracts and Permits Architectural Engineering</p>
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Elementary Mechanics, Hydromechanics, and Pneumatics were formerly included in this Course. With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; and some Papers were combined with others under a single title, the scope of the Course as a whole being increased.

### Architectural Drawing and Designing—A D

<p>Arithmetic Formulas Geometry and Mensuration Geometrical Drawing, 9 P. Architectural Drawing, 12 P.</p>	<p>Ornamental Drawing, 6 P. Advanced Architectural Drawing, 18 P. (10 Plates optional) History of Architecture Architectural Design</p>
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### Building Contractors'—A G; B C

<p>Arithmetic Formulas Geometry and Mensuration Geometrical Drawing, 9 P. Architectural Drawing, 12 P.</p>	<p>Masonry Carpentry Joinery Stair Building Estimating and Calculating Quantities Specifications</p>
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### Structural Engineering—A K

<p>Arithmetic Geometry and Mensuration Elements of Algebra Algebraic Equations and Elements of Trigonometry Geometrical Drawing, 9 P. Structural Drafting, 15 P. Loads in Structures Properties of Sections Materials of Structural Engineering</p>	<p>Beams and Girders Columns and Struts Details of Construction Graphical Analysis of Stresses Statics of Masonry Heavy Foundations Retaining Walls Fireproofing Roof-Truss Design Wind Bracing Specifications</p>
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### Complete Commercial—B A X

<p>Arithmetic Spelling Vertical Penmanship</p>	<p>Slanting Penmanship English Grammar Punctuation and Capitalization</p>
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## LIST OF SUBJECTS

## Complete Commercial—B A X (Continued)

Letter Writing	Double-Entry Bookkeeping
Stenography	Opening, Closing, and Changing Books
Typewriting	Corporation Organization and Bookkeeping
Single-Entry Bookkeeping	Elements of Cost Accounting

## Bank Bookkeeping

Either part of Penmanship is optional.

## Complete Stenographic—B B X

Spelling	Punctuation and Capitalization
Vertical Penmanship	Letter Writing
Slanting Penmanship	Stenography
English Grammar	Typewriting

Either part of Penmanship is optional.

## Bookkeeping and Business Forms—B E X

Arithmetic	Double-Entry Bookkeeping
Spelling	Opening, Closing, and Changing Books
Vertical Penmanship	Corporation Organization and Bookkeeping
Slanting Penmanship	Elements of Cost Accounting
Single-Entry Bookkeeping	Bank Bookkeeping

Either part of Penmanship is optional.

## Banking and Banking Law—B F X

History of Banking	Trust Companies
National and State Banks	Bank Bookkeeping
National Bank Supervision	Law of Commercial Paper
Savings Banks	Law of Banks and Banking

## Complete Commercial Law—B K

The Law in General	Law of Mechanics' Liens
Law of Personal Rights	Law of Guaranty and Suretyship
Law of Property	Law of Executors and Administrators
Law of Wills	Law of Debtor and Creditor
Law of Contracts	Law of Business and Commerce
Law of Commercial Papers	Law of Trusts
Law of Banks and Banking	Law of Husband and Wife
Law of Partnership	Law of Divorce
Law of Corporations	Law of Parent and Child
Law of Building Associations	Law of Guardian and Ward
Law of Beneficial Associations	Law of Notaries Public
Law of Agency	Law of Justices of the Peace
Law of Master and Servant	Law of Patents, Copyright, and Trade Marks
Law of Bailments	Law of Insurance
Law of Landlord and Tenant	Law of Mines and Mining

## Law for Corporation Managers, Business Men, Clerks, Stenographers, Bookkeepers, and Secretaries—B K A

Law of Contracts	Law of Corporations
Law of Commercial Paper	Law of Agency
Law of Banks and Banking	Law of Debtor and Creditor
Law of Partnership	Law of Business and Commerce

## Law for Contractors and Builders, Credit Men, Collectors, Real-Estate Agents, Conveyancers, and Insurance Agents—B K B

Law of Property	Law of Agency
Law of Wills	Law of Debtor and Creditor
Law of Contracts	Law of Landlord and Tenant
Law of Commercial Paper	Law of Executors and Administrators
Law of Corporations	Law of Insurance

## Law for Justices of the Peace, Magistrates, Aldermen, Notaries Public, Town Clerks, and Municipal Employes—B K C

Law of Property	Law of Corporations
Law of Wills	Law of Executors and Administrators
Law of Contracts	Law of Insurance
Law of Agency	Law of Justices of the Peace
Law of Landlord and Tenant	Law of Notaries Public

## LIST OF SUBJECTS

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### Complete Advertising—B M; B M X

Advertisement Construction*	Specimen Ads*
Principles of Typographical Display*	Printing and Copy Preparation*
Ad Illustrations and Stereotyping*	Supplementary Advertising*
Engraving Processes*	Advertising Management*
Department-Store Advertising*	

### Window Trimming and Mercantile Decoration—B O

Coverings, Plaitings, and Puffings†	Men and Women's Furnishings
Smocking, Paneling, and Fresco Decorations†	Handkerchiefs
Wall- and Crape-Paper Decorations†	Linens
Festooning and Curtain Draping†	House Furnishings
Colors and Color Combinations†	Miscellaneous Merchandise
Dress Goods	Decorations
White Goods	Collection of Artistic Displays
Clothing	Illumination and Motion in Displays
Foot, Hand, and Head Covering	Fixtures and Useful Information
Ideas for Window Decorations	

### Window Trimming, Show-Card Writing, and Advertising—B P; B T; B P X; B T X

This Course contains all the subjects taught in the Window Dressing, Show-Card Writing and Advertising Courses, given on pages 3 and 5.

### Window Trimming and Show-Card Writing—B Q; B V

This Course contains all the subjects taught in the Window Dressing and Show-Card Writing Courses, given on pages 3 and 5.

### Window Trimming and Advertising—B R; B R X

This Course contains all the subjects taught in the Window Dressing and Advertising Courses, given on this page.

### Show-Card Writing and Advertising—B S; B W; B S X; B W X

This Course contains all the subjects taught in the Show-Card Writing and Advertising Courses, given on pages 3 and 5.

### General Chemistry—C A; C A X; D

Arithmetic	Inorganic Chemistry
Elementary Algebra	Qualitative Analysis
Mensuration	Organic Chemistry
Physics	Quantitative Analysis

With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; and new Papers were added, the scope of the Course as a whole being increased.

### Chemistry and Chemical Technology—C B; C B X

Arithmetic	Manufacture of Iron
Elementary Algebra	Manufacture of Steel
Mensuration	Packing-House Industries
Physics	Cottonseed Oil and Products
Inorganic Chemistry	Manufacture of Leather
Qualitative Analysis	Manufacture of Soap
Organic Chemistry	Manufacture of Cement
Quantitative Analysis	Manufacture of Paper
Sulphuric Acid	Manufacture of Sugar
Alkalies and Hydrochloric Acid	Petroleum and Products
Manufacture of Gas	

See remarks under General Chemistry on this page.

### Chemistry and Manufacture of Sulphuric Acid—C E; C E X

Arithmetic	Physics
Elementary Algebra	Inorganic Chemistry
Mensuration	Quantitative Analysis
Sulphuric Acid	

See remarks under General Chemistry, on this page.

\*Printed under the general title of Retail Advertising, in 13 parts.

†Printed under the general title of Backgrounds, in 12 parts.

## LIST OF SUBJECTS

**Chemistry and Manufacture of Alkalies and Hydrochloric Acid—C F; C F X**

Arithmetic	Physics
Elementary Algebra	Inorganic Chemistry
Mensuration	Quantitative Analysis

**Alkalies and Hydrochloric Acid**

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Iron and Steel—C G; C G X**

Arithmetic	Inorganic Chemistry
Elementary Algebra	Quantitative Analysis
Mensuration	Manufacture of Iron
Physics	Manufacture of Steel

See remarks under General Chemistry, on page 3.

**Chemistry and Packing-House Industries—C H; C H X**

Arithmetic	Physics
Elementary Algebra	Inorganic Chemistry
Mensuration	Quantitative Analysis

**Packing-House Industries**

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Cottonseed Oil and Products—C I; C I X**

Arithmetic	Physics
Elementary Algebra	Inorganic Chemistry
Mensuration	Quantitative Analysis

**Cottonseed Oil and Products**

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Leather—C J; C J X**

Arithmetic	Inorganic Chemistry
Elementary Algebra	Qualitative Analysis
Mensuration	Quantitative Analysis
Physics	Manufacture of Leather

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Soap—C K; C K X**

Arithmetic	Inorganic Chemistry
Elementary Algebra	Qualitative Analysis
Mensuration	Quantitative Analysis
Physics	Manufacture of Soap

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Cement—C N; C N X**

Arithmetic	Inorganic Chemistry
Elementary Algebra	Qualitative Analysis
Mensuration	Quantitative Analysis
Physics	Manufacture of Cement

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Paper—C O; C O X**

Arithmetic	Inorganic Chemistry
Elementary Algebra	Qualitative Analysis
Mensuration	Quantitative Analysis
Physics	Manufacture of Paper

See remarks under General Chemistry, on page 3.

**Chemistry and Manufacture of Sugar—C Q; C Q X**

Arithmetic	Inorganic Chemistry
Elementary Algebra	Organic Chemistry
Mensuration	Quantitative Analysis
Physics	Manufacture of Sugar

See remarks under General Chemistry, on page 3.

**Chemistry, Petroleum, and Manufacture of Products—C R; C R X**

Arithmetic	Physics
Elementary Algebra	Inorganic Chemistry
Mensuration	Quantitative Analysis

**Petroleum and Products**

See remarks under General Chemistry, on page 3.

# LIST OF SUBJECTS

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## Chemistry and Manufacture of Gas—C W; C W X

Arithmetic	Inorganic Chemistry
Elementary Algebra	Organic Chemistry
Mensuration	Quantitative Analysis
Physics	Manufacture of Gas

See remarks under General Chemistry, on page 3.

## Complete Lettering and Sign Painting—D H; D G; L S; S P; D H X; D G X

Elements of Lettering	Lettering and Sign Painting, 34 P.
The Formation of Letters	Sign and Banner Making
	Practical Design and Ornament

The last two subjects are not included in the Course given to students having the class letters D H, D G, L S, or S P.

## Sheet-Metal Pattern Drafting—D N; D I; Y; Z; D N A

Arithmetic*	Development of Surfaces, 5 P
Mensuration*	Practical Pattern Problems
Instrumental Drawing, 2 P.	Architectural Proportion
Geometrical Drawing, 8 P.	Development of Moldings
Practical Projection, 7 P.	Skylights

With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; and new Papers were added, the scope of the Course as a whole being increased.

## Advanced Show-Card Writing—D V; D W

Show-Card Writing	Letter Formation, 15 P.
	Show-Card Design and Ornament

The second subject given is not counted as a subject; credit is given instead for the Plates drawn.

## Mechanical Drawing Without Mathematics—D X; D X A

Geometrical Drawing, 9 P.	Sketching
Mechanical Drawing, 19 P.	Practical Projection, 7 P.
	Development of Surfaces, 5 P.

## Mechanical Drawing With Mathematics—D Y; D Y A

Arithmetic	Geometrical Drawing, 9 P.
Elements of Algebra	Mechanical Drawing, 19 P.
Logarithms	Sketching
Geometry and Trigonometry	Practical Projection, 7 P.
	Development of Surfaces, 5 P.

## Draftsmen's Course—D Z; D Z A

Arithmetic	Sketching
Elements of Algebra	Practical Projection, 7 P.
Logarithms	Development of Surfaces, 5 P.
Geometry and Trigonometry	Elementary Mechanics
Geometrical Drawing, 9 P.	Strength of Materials
Mechanical Drawing, 19 P.	Applied Mechanics
	Machine Design

## Boilermakers' Course—S C A; D C; D C A

Arithmetic	Heat and Steam
Elements of Algebra	Types of Steam Boilers
Logarithms†	Boiler Details
Geometry and Trigonometry†	Boiler Design
Elementary Mechanics	Geometrical Drawing, 9 P.
Strength of Materials	Practical Projection, 7 P.
	Development of Surfaces, 5 P.

## Drawing for Monument Workers—D D X; D D B

Geometrical Drawing, 5 Exercises	Practical Monument Designing
Projection Drawing, 6 Exercises	Classic Ornament
Freehand and Ornamental Drawing, 6 Exercises	Elements of Pen-and-Ink Rendering
The Formation of Letters, 10 P.	Rendering With Pen and Brush, 6 P.
Elements of Architecture	Elements of Water-Color Rendering
	Rendering in Water Color

\*Printed under the general title of Arithmetic, in 12 parts.

†Not included in Course at first.



## LIST OF SUBJECTS

**Structural Drafting—D Q; D Q A**

Arithmetic	Algebraic Equations and Elements of Trigonometry
Geometry and Mensuration	Geometrical Drawing, 5 P.
Elements of Algebra	Structural Drafting, 15 P.

**Complete Electrical Engineering—E A A**

Arithmetic	Primary Batteries
Elements of Algebra	Electrical Measurements
Logarithms	Dynamos and Dynamo Design
Geometry and Trigonometry	Direct-Current Motors
Geometrical Drawing, 9 P.	Alternating Currents
Mechanical Drawing, 19 P.	Alternators
Sketching	Alternating-Current Apparatus
Practical Projection, 7 P. (Optional)	Design of Alternating-Current Apparatus
Development of Surfaces, 5 P. (Optional)	Electric Transmission
Principles of Mechanics	Line Construction
Machine Elements	Switchboards and Switchboard Appliances
Mechanics of Fluids	Power Transformation and Measurement
Strength of Materials	Storage Batteries
Heat and Steam	Incandescent Lighting
The Steam Engine	Arc Lighting
The Indicator	Interior Wiring
Engine Testing	Electric Power Stations
Governors	Telegraph Systems
Valve Gears	Telephone Systems
Steam Turbines	Applied Electricity
Electricity and Magnetism	Electric-Railway Systems
Electrodynamics	Line and Track
Electrical Resistance and Capacity	Line Calculations
The Magnetic Circuit	Motors and Controllers
Electromagnetic Induction	Electric-Car Equipment
Chemistry and Electrochemistry	Multiple-Unit Systems

**Electrical Engineering, Part 1—E A B**

This Course comprises the subjects of the Complete Electrical Engineering Course, given on this page, from the beginning up to and including Alternating-Current Apparatus.

**Electrical Engineering, Part 2—E A C**

This Course comprises the advanced subjects of the Complete Electrical Engineering Course, given on this page, beginning with Dynamos and Dynamo Design, up to and including Multiple-Unit Systems.

**Telephone Engineering—E G X**

Arithmetic	Installation of Telephones
Mensuration	Line Disturbances and Transpositions
Elements of Algebra	Long-Distance Telephony
Algebraic Equations and Elements of Trigonometry	Magneto-Switchboards
Principles of Mechanics	Large Magneto-Switchboards
Machine Elements	Principles of Central-Energy Systems
Electricity and Magnetism	Central-Energy Systems
Electrodynamics	Central-Energy Main and Branch Exchanges
Electrical Resistance and Capacity	Common-Battery Signaling Systems
The Magnetic Circuit	Telephone Switchboard Apparatus
Electromagnetic Induction	Bell Central-Energy System
Chemistry and Electrochemistry	Bell Trunk Circuits
Primary Batteries	Bell Toll and Testing Circuits
Electrical Measurements	Kellogg Central-Energy System
Principles of Telephony	Party Line Systems
Properties of Telephone Circuits	Exchange Wiring and Extension Telephones
Telephone Receivers	Simultaneous Telephony and Telegraphy
Telephone Transmitters	Automatic Telephone System
Telephone Apparatus	House Telephones
Magneto-Generators and Bells	Testing of Telephone Circuits
Circuits of Telephone Instruments	Storage Batteries
Telephone Instruments	Telephone-Line Construction
	Telephone Cables
	Power Equipment

## LIST OF SUBJECTS

7

### Telegraph Engineering—E H

Arithmetic Mensuration Elementary Algebra and Trigonometric Functions Elementary Mechanics	Principles of Electricity and Magnetism Electrical Measurements Batteries Elements of Telegraph Operating (Optional) Telegraphy
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### Electric Lighting—E N

Arithmetic Mensuration Principles of Mechanics Machine Elements Elements of Electricity and Magnetism Dynamos and Motors Dynamo-Electric Machinery	Alternating Currents Operation of Dynamos and Motors Electric Transmission Electric Lighting Interior Wiring Geometrical Drawing, 9 P. (Optional) Mechanical Drawing, 7 P. (Optional)
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### Electric Car Running—E O X

Arithmetic Electricity and Magnetism Direct-Current Dynamos Electric Motors Source and Distribution of Power Current Collectors Trunk Connections Resistance Coils and Cables Railway Motors Simple Control Circuits Series-Parallel Control Metallic-Return Systems	Car-Wiring Diagrams Electric Car Heating and Lighting Hand-Brakes Straight Air Brakes Automatic Air Brakes Electric Brakes and Signals Mechanical Instructions Operating Instructions Trial Equipment Armature Repair Work Maintenance of Equipment Electrical Measurements and Tests
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### Electric Lighting and Railways—E P

Arithmetic Mensuration Principles of Mechanics Machine Elements Elements of Electricity and Magnetism Dynamos and Motors Dynamo-Electric Machinery	Alternating Currents Operation of Dynamos and Motors Electric Transmission Electric Lighting Electric Railways Interior Wiring Geometrical Drawing, 9 P. (Optional) Mechanical Drawing, 7 P. (Optional)
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### Dynamo Running—E Q

Arithmetic Mensuration Principles of Mechanics (Optional) Machine Elements (Optional)	Elements of Electricity and Magnetism Dynamos and Motors Operation of Dynamos and Motors Dynamo-Electric Machinery
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### Interior Wiring—E R

Arithmetic Mensuration Elements of Electricity and Magnetism	Dynamos and Motors Interior Wiring Geometrical Drawing, 9 P. (Optional) Mechanical Drawing, 7 P. (Optional)
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### Electric Railways—E S

Arithmetic Mensuration Principles of Mechanics Machine Elements Elements of Electricity and Magnetism Dynamos and Motors	Dynamo-Electric Machinery Alternating Currents Operation of Dynamos and Motors Electric Transmission Electric Railways Geometrical Drawing, 9 P. (Optional) Mechanical Drawing, 7 P. (Optional)
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### Advanced Electric Railways—E V

Arithmetic Mensuration Principles of Mechanics Machine Elements Heat and Steam	Types of Steam Boilers Boiler Details Boiler Fittings Combustion, Firing, and Draft Boiler Management
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## Advanced Electric Railways—E V (Continued)

Boiler Feeding and Feedwater Problems	Steam Heating
The Steam Engine	Elements of Electricity and Magnetism
The Indicator	Dynamos and Motors
Engine Testing	Dynamo-Electric Machinery
Governors	Alternating Currents
Valve Gears	Operation of Dynamos and Motors
Compound Engines	Electric Transmission
Engine Management	Electric Railways
Steam Turbines*	Geometrical Drawing, 9 P. (Optional)
Pumps	Mechanical Drawing, 7 P. (Optional)

## Advanced Electric Lighting—E X; E U

Arithmetic	Valve Gears
Mensuration	Compound Engines
Principles of Mechanics	Engine Management
Machine Elements	Steam Turbines*
Heat and Steam	Pumps
Types of Steam Boilers	Steam Heating
Boiler Details	Elements of Electricity and Magnetism
Boiler Fittings	Dynamos and Motors
Combustion, Firing, and Draft	Dynamo-Electric Machinery
Boiler Management	Alternating Currents
Boiler Feeding and Feedwater Problems	Operation of Dynamos and Motors
The Steam Engine	Electric Transmission
The Indicator	Electric Lighting
Engine Testing	Interior Wiring (Optional)
Governors	Geometrical Drawing, 9 P. (Optional)
	Mechanical Drawing, 7 P. (Optional)

## Architectural Drawing—F A; F B

Arithmetic*	Architectural Drawing, 12 P.
Formulas*	Advanced Architectural Drawing, 18 P.
Geometry and Mensuration*	Elements of Pen-and-Ink Rendering
Geometrical Drawing, 9 P.	Rendering With Pen and Brush, 6 P.
Freehand Drawing, 6 P.	Elements of Water-Color Rendering
Elements of Perspective	Rendering in Water Color, 7 P.
Perspective Drawing, 4 P.	Elements of Architecture

## Perspective Drawing—F C; F E

Arithmetic (Optional)*	Elements of Perspective
Geometrical Drawing, 9 P.	Perspective Drawing, 4 P.
Freehand Drawing, 6 P.	Architectural Drawing, 12 P.
	Drawing From Nature

## General Illustrating—F J; F K

Arithmetic (Optional)*	Rendering With Pen and Brush, 6 P.
Geometrical Drawing, 9 P.	Elements of Water-Color Rendering
Freehand Drawing, 6 P.	Rendering in Water Color, 7 P.
Elements of Perspective	Drawing From Nature
Perspective Drawing, 4 P.	Drawing From Cast, 7 P.
Elements of Pen-and-Ink Rendering	Elements of Figure Drawing
	Drawing From the Figure, 13 P.

## Newspaper Illustrating—F L; F M

Arithmetic (Optional)*	Elements of Pen-and-Ink Rendering
Geometrical Drawing, 9 P.	Rendering With Pen and Brush, 6 P.
Freehand Drawing, 6 P.	Drawing From Cast, 7 P.
Elements of Perspective	Elements of Figure Drawing
Perspective Drawing, 4 P.	Drawing From the Figure, 13 P.

## Architectural Rendering—F N; F O

Arithmetic (Optional)*	Elements of Perspective
Geometrical Drawing, 9 P.	Perspective Drawing, 4 P.
Freehand Drawing, 6 P.	Architectural Drawing, 12 P.

\*Formerly not included in this Course.

## LIST OF SUBJECTS

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### Architectural Rendering—F N; F O (Continued)

Advanced Architectural Drawing, 18 P. (Optional)	Rendering With Pen and Brush, 6 P.
Elements of Pen-and-Ink Rendering	Elements of Water-Color Rendering
	Rendering in Water Color, 7 P.
	Drawing From Nature

### Carpet Design—F P; F Q

Arithmetic (Optional)*	Elements of Ornament
Geometrical Drawing, 5 P.	Practical Design
Freehand Drawing, 6 P.	Applied Design
Historic Ornamental Drawing, 5 P.	Plant Analysis
Historic Ornament	Distemper Color
	Carpet Design

### Wallpaper Design—F R; F T

Arithmetic (Optional)*	Elements of Ornament
Geometrical Drawing, 5 P.	Practical Design
Freehand Drawing, 6 P.	Applied Design
Historic Ornamental Drawing, 5 P.	Plant Analysis
Historic Ornament	Distemper Color
	Wallpaper Designing

### Linoleum Design—F V; F U

Arithmetic (Optional)*	Elements of Ornament
Geometrical Drawing, 5 P.	Practical Design
Freehand Drawing, 6 P.	Applied Design
Historic Ornamental Drawing, 5 P.	Plant Analysis
Historic Ornament	Distemper Color
	Oilcloth and Linoleum Designing

### Bookcover Design—F W; F X

Arithmetic (Optional)*	Elements of Ornament
Geometrical Drawing, 5 P.	Practical Design
Freehand Drawing, 6 P.	Applied Design
Historic Ornamental Drawing, 5 P.	Plant Analysis
Historic Ornament	Distemper Color
	Bookcover Designing

### General Design—F Y; F Z

Arithmetic (Optional)*	Historic Ornament
Geometrical Drawing, 5 P.	Elements of Ornament
Freehand Drawing, 6 P.	Practical Design
Historic Ornamental Drawing, 5 P.	Applied Design
	Plant Analysis

### Civil Engineering—G A; T

Arithmetic	Railroad Location
Formulas	Railroad Construction
Geometrical Drawing, 9 P.	Trackwork
Mechanical Drawing, 9 P.	Railroad Structures
Geometry and Trigonometry	Drainage
Elementary Mechanics	Sewerage
Algebra	Streets and Highways
Logarithms	Paving
Hydraulics	Waterwheels
Pneumatics	Hydraulic Machinery
Elementary Graphical Statics	Water Supply and Distribution
Strength of Materials	Irrigation
Analysis of Stresses	Heat
Proportioning the Material	Steam and Steam Engines
Details of Construction	Steam Boilers
Details, Bills, and Estimates	Locomotives
Surveying	Elements of Electricity and Magnetism†
Land Surveying	Dynamos and Motors
Mapping, 6 P.	Electric Lighting

\*Formerly not included in this course.

†Printed under the title of Dynamos and Motors, Part I.

B

## LIST OF SUBJECTS

**Civil Engineering—G A; T (Continued)**

Electric Railways  
 Descriptive Astronomy  
 Elementary Chemistry  
 Geology  
 Blowpiping  
 Mineralogy  
 Formulas is not sent to students taking Algebra directly after Arithmetic

**Railroad Engineering—G B; G B X; R**

Arithmetic  
 Formulas  
 Geometrical Drawing, 9 P.  
 Mechanical Drawing, 9 P.  
 Geometry and Trigonometry  
 Elementary Mechanics  
 Hydromechanics  
 Algebra  
 Logarithms  
 Pneumatics  
 Strength of Materials  
 Surveying  
 Land Surveying  
 Mapping, 6 P.  
 Railroad Location  
 Railroad Construction  
 Trackwork  
 Railroad Structures  
 Formulas is not sent to students taking Algebra directly after Arithmetic.

**Surveying and Mapping—G C X**

Arithmetic  
 Elements of Algebra  
 Logarithms  
 Geometrical Drawing, 9 P.  
 Mapping, 7 P.  
 Geometry  
 Plane Trigonometry  
 Chain Surveying  
 Compass Surveying  
 Transit Surveying  
 Leveling  
 Circular Curves  
 Stadia and Plane Table Surveying  
 Topographical Surveying  
 Hydrographic Surveying  
 United States Land Surveys  
 Practical Astronomy

**Bridge Engineering—G D; B**

Arithmetic  
 Formulas  
 Geometrical Drawing, 9 P.  
 Mechanical Drawing, 9 P.  
 Geometry and Trigonometry  
 Elementary Mechanics  
 Hydromechanics  
 Algebra  
 Logarithms  
 Pneumatics  
 Elementary Graphical Statics  
 Strength of Materials  
 Analysis of Stresses  
 Proportioning the Material  
 Details of Construction  
 Details, Bills, and Estimates  
 Formulas is not sent to students taking Algebra directly after Arithmetic

**Municipal Engineering—G F; I**

Arithmetic  
 Formulas  
 Geometrical Drawing, 9 P.  
 Mechanical Drawing, 7 P.  
 Geometry and Trigonometry  
 Elementary Mechanics  
 Hydromechanics  
 Algebra  
 Logarithms  
 Pneumatics  
 Strength of Materials  
 Surveying  
 Land Surveying  
 Mapping, 6 P.  
 Drainage  
 Sewerage  
 Streets and Highways  
 Paving  
 Formulas is not sent to students taking Algebra directly after Arithmetic.

**Hydraulic Engineering—G G; V**

Arithmetic  
 Formulas  
 Geometrical Drawing, 9 P.  
 Mechanical Drawing, 5 P.  
 Geometry and Trigonometry  
 Elementary Mechanics  
 Algebra  
 Logarithms  
 Hydraulics  
 Pneumatics  
 Strength of Materials  
 Surveying  
 Surveying and Mapping, 5 P.  
 Steam Engine Mechanism\*  
 Steam and Steam Engines  
 Steam Boilers  
 Waterwheels  
 Hydraulic Machinery  
 Water Supply and Distribution  
 Irrigation  
 Formulas is not sent to students taking Algebra directly after Arithmetic.

**Marine Engineers—H B; H M**

Arithmetic  
 Mensuration  
 Principles of Mechanics  
 Machine Elements

\*Printed under the title of Steam and Steam Engines, Part 1.

**Marine Engineers'—H B; H M (Continued)**

Mechanics of Fluids	Steam Boiler Management†
Strength of Materials	Steam Engines
Elements of Electricity and Magnetism	Machinery of Western River Steamboats
Dynamos and Motors	Recent Developments in Marine Engineering
Operation of Dynamos and Motors	Geometrical Drawing, 9 P. (Optional)
Steam and Steam Boilers	Mechanical Drawing, 7 P. (Optional)

Machinery of Western River Steamboats and Recent Developments in Marine Engineering were formerly not included in this Course. With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; and some Papers printed under a single title and in parts were given separate titles, the scope of the Course as a whole being increased.

**Steam-Electric—H D**

Arithmetic	Governors
Mensuration	Valve Gears
Principles of Mechanics	Condensers
Machine Elements	Compound Engines
Mechanics of Fluids	Engine Management
Strength of Materials	Engine Installation
Heat and Steam	Steam Turbines*
Types of Steam Boilers	Pumps
Boiler Details	Elements of Electricity and Magnetism
Boiler Fittings	Dynamos and Motors
Boiler Design	Dynamo-Electric Machinery
Combustion, Firing, and Draft	Elevators
Economic Combustion of Coal	Steam Heating
Automatic Furnaces and Mechanical Stokers	Alternating Currents
Boiler Installation	Operation of Dynamos and Motors
Boiler Management	Electric Transmission
Boiler Trials	Electric Lighting
Boiler Feeding and Feedwater Problems	Electric Railways
The Steam Engine	Interior Wiring
The Indicator	Geometrical Drawing, 9 P.
Engine Testing	Mechanical Drawing, 7 P.

**Complete Steam Engineering—H E**

Arithmetic	The Steam Engine
Mensuration	The Indicator
Principles of Mechanics	Engine Testing
Machine Elements	Governors
Mechanics of Fluids	Valve Gears
Strength of Materials	Condensers
Heat and Steam	Compound Engines
Types of Steam Boilers	Engine Management
Boiler Details	Engine Installation
Boiler Fittings	Steam Turbines*
Boiler Design	Pumps
Combustion, Firing, and Draft	Elements of Electricity and Magnetism
Economic Combustion of Coal	Dynamos and Motors
Automatic Furnaces and Mechanical Stokers	Operation of Dynamos and Motors
Boiler Installation	Elevators
Boiler Management	Steam Heating
Boiler Trials	Geometrical Drawing, 9 P.
Boiler Feeding and Feedwater Problems	Mechanical Drawing, 7 P.

**Engine and Dynamo Running—H F**

Arithmetic	Boiler Feeding and Feedwater Problems
Mensuration	The Steam Engine
Principles of Mechanics	Valve Gears
Machine Elements	Engine Management
Heat and Steam	Steam Turbines*
Types of Steam Boilers	Pumps
Boiler Details	Elements of Electricity and Magnetism
Boiler Fittings	Dynamos and Motors
Combustion, Firing, and Draft	Operation of Dynamos and Motors
Boiler Management	Dynamo-Electric Machinery
	Elevators (Optional)

†Printed under the title of Steam and Steam Boilers, Part 2.

\*Formerly not included in this Course.

## LIST OF SUBJECTS

## Engine Running—H H

Arithmetic	The Steam Engine
Mensuration	Valve Gears
Principles of Mechanics	Engine Management
Machine Elements	Steam Turbines*
Heat and Steam	Pumps
Types of Steam Boilers	Elements of Electricity and Magnetism (Optional)
Boiler Details	Dynamos and Motors (Optional)
Boiler Fittings	Operation of Dynamos and Motors (Optional)
Combustion, Firing, and Draft	Elevators (Optional)
Boiler Management	Steam Heating
Boiler Feeding and Feedwater Problems	

## Advanced Engine Running—H J

Arithmetic	Engine Testing
Mensuration	Governors
Principles of Mechanics	Valve Gears
Machine Elements	Compound Engines
Heat and Steam	Engine Management
Types of Steam Boilers	Steam Turbines*
Boiler Details	Pumps
Boiler Fittings	Elements of Electricity and Magnetism
Combustion, Firing, and Draft	Dynamos and Motors
Boiler Management	Operation of Dynamos and Motors
Boiler Feeding and Feedwater Problems	Elevators
The Steam Engine	Steam Heating
The Indicator	Geometrical Drawing, 9 P. (Optional)
	Mechanical Drawing, 7 P. (Optional)

## Stationary Firemen's Course—H K

Arithmetic	Boiler Fittings
Mensuration	Combustion, Firing, and Draft
Heat and Steam	Boiler Management
Types of Steam Boilers	Boiler Feeding and Feedwater Problems
Boiler Details	Steam Heating

## English Branches—I A; I B; E B; X X

Arithmetic	Physical Geography
Spelling	United States History
Slanting Penmanship	United States Civil Government
Vertical Penmanship	Composition and Rhetoric
Grammar	Letter Writing
Geography	Punctuation and Capitalization

Until March 1, 1905 the subjects of Arithmetic, Spelling, Slanting or Vertical Penmanship (either one optional), Grammar, Punctuation and Capitalization, Letter Writing, Geography, U. S. History, and U. S. Civil Government were sold under the title of English Branches, First, class letter I A; the subjects of Arithmetic, Spelling, Slanting or Vertical Penmanship (either one optional), Grammar, Punctuation and Capitalization, and Letter Writing were sold under the title of English Branches, Second, class letter I B. Since then the student is permitted to choose, if enrolled under the class letter I A, any nine of the subjects given in the list; if enrolled under the class letter I B, the student may choose any seven of the subjects given in the list.

## Teachers'—I C; C T

Arithmetic	Color Harmony, 2 P.†
Slanting Penmanship	Algebra
Vertical Penmanship	Pedagogics of Arithmetic
Grammar	Pedagogics of Grammar
Punctuation and Capitalization	Pedagogics of Geography
Double-Entry Bookkeeping	Pedagogics of History
Geometrical Drawing, 9 P.	Pedagogics of Orthography
Freehand Drawing, 6 P.	Physics
Historic Ornament	Physiology
Elements of Perspective	Physical Geography
Perspective Drawing, 4 P.	Composition and Rhetoric
	U. S. Civil Government

The last five subjects were formerly not included in this Course. Either part of Penmanship is optional.

\*Formerly not included in this Course.

†Not counted as a separate subject, but credit is given for Plates drawn by student.

# LIST OF SUBJECTS

13

## Methods of Teaching—I D; P E

Pedagogs of Arithmetic	Pedagogs of Geography
Pedagogs of Grammar	Pedagogs of U. S. History
	Pedagogs of Orthography

## Special Teacher's Course—I M

Arithmetic	Composition and Rhetoric
Algebra	Physical Geography
Vertical Penmanship	Physics
Slanting Penmanship	Geology
Grammar	Zoology
Punctuation and Capitalization	American Literature
Double-Entry Bookkeeping	English Literature
Geometrical Drawing	History of Education
Freehand Drawing	General History
Historic Ornament	Biology
Elements of Perspective	Botany
Perspective Drawing	Astronomy
Color Harmony, 2 P.*	Economics
Pedagogs of Arithmetic	Geometry
Pedagogs of Grammar	Plane Trigonometry
Pedagogs of Geography	Psychology
Pedagogs of History	Latin Grammar
Pedagogs of Orthography	Cæsar's Gallic War
Physiology	Virgil's Æneid
Civil Government	Orations of Cicero

### Chemistry

Student has choice of any seven subjects in the list given.

## Civil Service—Clerk, Departmental Service—I H X A

Spelling	Slanting or Vertical Penmanship
Arithmetic	Grammar
Copying (Rough Draft)	Letter Writing

## Civil Service—Bookkeeper, Departmental Service—I H X B

Spelling	Grammar
Arithmetic	Letter Writing
Copying (Rough Draft)	Double-Entry Bookkeeping
Slanting or Vertical Penmanship	Journalizing and Business Statements

## Civil Service—Stenographer and Typewriter, Departmental Service—I H X C

Spelling	Grammar
Arithmetic	Letter Writing
Copying (Plain Copy and Rough Draft)	Stenography
Slanting or Vertical Penmanship	Speed Shorthand
	Typewriting

## Civil Service—Clerk, Day Inspector, Sampler, Junior Clerk, in Custom-House Service—I H X D

Spelling	Geography
Arithmetic	Grammar
Slanting or Vertical Penmanship	Letter Writing

## Civil Service—Clerk, Gauger, Storekeeper, Storekeeper Gauger, in Internal-Revenue Service—I H X E

Spelling	Slanting or Vertical Penmanship
Arithmetic	Gauging and Elementary Physics
Copying (Plain Copy)	Grammar
	Letter Writing

## Civil Service—Immigrant Inspector, Immigration Service—I H X F

Spelling	Slanting or Vertical Penmanship
Arithmetic	Grammar
Copying (Plain Copy)	Letter Writing
	Immigration Law

\*Not counted as a separate subject, but credit is given for Plates drawn by student.



## LIST OF SUBJECTS

- Civil Service—Chinese Inspector, Immigration Service—I H X G  
 Spelling Slanting or Vertical Penmanship  
 Arithmetic Grammar  
 Copying (Plain Copy) Letter Writing  
 Chinese Exclusion Law
- Civil Service—Railway Mail Clerk, Railway Mail Weigher, Railway Mail  
 Porter, in Departmental Service—I K X A  
 Spelling Geography  
 Arithmetic Transportation  
 Copying (Plain Copy) Comparison of Addresses  
 Slanting or Vertical Penmanship Grammar  
 Letter Writing
- Civil Service—Clerk, Carrier, in Post-Office Service—I K X B  
 Spelling Comparison of Addresses  
 Arithmetic Slanting or Vertical Penmanship  
 Copying (Plain Copy) Grammar  
 Geography Letter Writing
- Civil Service—Tagger, Departmental Service; Assistant Weigher, Messenger,  
 Night Inspector, in Custom-House Service—I K X C  
 Spelling Slanting or Vertical Penmanship  
 Arithmetic Grammar  
 Copying (Plain Copy) Letter Writing
- Civil Service—Compositor, Bureau of Printing—I L X A  
 Spelling Grammar  
 Arithmetic Letter Writing  
 Copying (Rough Draft) Typesetting and Proofreading  
 Slanting or Vertical Penmanship Tabulating  
 Title Page Composition
- Civil Service—Apprentice, Elevator Conductor, Messenger, Skilled Laborer,  
 Watchman, in Departmental Service; Apprentice, Bookbinder, Electro-  
 type Molder, Pressman, Press Feeder, Printer's Assistant, in Bureau of  
 Printing; Guard, United States Penitentiary Service; Attendant, Fore-  
 man, Inspectress, Janitor, Porter, Watchman, Opener and Packer, Classi-  
 fied Laborer, in Custom-House Service—I L X B  
 Spelling Copying (Plain Copy)  
 Arithmetic Slanting or Vertical Penmanship  
 Letter Writing
- Civil Service—Rural Free Delivery Carrier, Post-Office Service—I L X C  
 Spelling Slanting or Vertical Penmanship  
 Arithmetic Copying Addresses  
 Postal Information
- Ocean Navigation—K A; N N; K A A  
 Arithmetic Compass Errors\*  
 Elementary Algebra Navigation  
 Logarithms Nautical Astronomy  
 Geometry and Trigonometry Ocean Meteorology  
 Spherical Trigonometry Rules of the Road
- Lake Navigation—K B; K B A  
 Arithmetic Geometry and Mensuration  
 Rudiments of Algebra Compass Errors\*\*  
 Lake Navigation

\*Printed under the title of Navigation, Part 1.

\*\*Printed under the title of Lake Navigation, Part 1.

## LIST OF SUBJECTS

15

### Coast Navigation—K D; K D A

Arithmetic Elements of Navigation Variation and Deviation Elements of Geometry Chart, Lead, and Log	Piloting Dead Reckoning Latitude by Observation Longitude by Observation Amplitude and Azimuth Code Signals and Rules of the Road
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### Spanish Language—L A; F S; L A P; L H; L H P

Conversational Lessons, 15 Parts Spanish Reader, 12 Parts	Spanish Grammar, 12 Parts
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### German Language—L B; L B P; F G

Conversational Lessons, 15 Parts German Reader, 10 Parts	German Grammar, 12 Parts
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### French Language—L C; L C P; F F

Conversational Lessons, 15 Parts French Reader, 12 Parts	French Grammar, 12 Parts
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### English-French Language—L F; L F P; L G

Conversational Lessons, 15 Parts	English-French Grammar, 12 Parts
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### English-Spanish Language—L O; L O P

Conversational Lessons, 15 Parts	English-Spanish Grammar, 12 Parts
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### Mechanical Engineering—M C; M A; L E; M C X

This Course contains all the subjects taught in the Mechanical and Shop Practice Courses given on pages 15 and 16.

### Mechanical—M W; M U; M B; C; M W X

Arithmetic Formulas Geometrical Drawing, 9 P. Mechanical Drawing, 16 P. Practical Projection, 7 P. (Optional) Development of Surfaces, 5 P. (Optional) Sketching Geometry and Trigonometry Elementary Mechanics Hydromechanics	Algebra Logarithms Pneumatics Heat Steam and Steam Engines Strength of Materials Applied Mechanics Steam Boilers Machine Design Elements of Electricity and Magnetism† Dynamos and Motors
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Formulas is not sent to students taking Algebra directly after Arithmetic. The option of taking Practical Projection and Development of Surfaces is regularly given to students having class letters **MU**, **MW**, **MC**. The Paper on Sketching is only sent to students having class letters **M CX** or **M WX**.

### Complete Shop Practice—M H; C S; M H X

Reading Working Drawings (Optional) Arithmetic Measuring Instruments Precision Measurements Lathe Work Working Chilled Iron Planer Work Shaper and Slotter Work Drilling and Boring Milling-Machine Work Gear Calculations Gear-Cutting Grinding Bench, Vise, and Floor Work Erecting	Shop Hints General Tool-Room Work* Toolmaking Gauges and Gauge Making Dies and Die Making Jigs and Jig Making Wood Working Wood Turning Pattern-Shop Equipment†† Patternmaking Molding in General‡ Green-Sand Molding Core Making Dry-Sand and Loam Work Cupola Practice
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†Printed under the title of Dynamos and Motors, Part 1.

\*Printed under the title of Toolmaking, Part 1.

††Printed under the title of Patternmaking, Part 1.

‡Printed under the title of Green-Sand Molding, Part 1.

## LIST OF SUBJECTS

**Complete Shop Practice—M H; C S; M H X (Continued)**

Mixing Cast Iron	Iron Forging
Machine Molding	Tool Dressing
Foundry Appliances	Hardening and Tempering
Malleable Casting	Treatment of Low-Carbon Steel
Brass Founding	Hammer Work
Blacksmith-Shop Equipment	Machine Forging

**Special Forging Operations**

With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; some Papers formerly presented under a single title and in parts were given separate titles; and new Papers were added, the scope of the Course as a whole being increased.

**Shop Practice, Machine-Shop Division—M F; M I; C S F**

Reading Working Drawings (Optional)	Gear Calculations
Arithmetic	Gear-Cutting
Lathe Work	Grinding
Working Chilled Iron (Optional)	Bench, Vise, and Floor Work
Planer Work	Erecting
Shaper and Slotter Work	Shop Hints
Drilling and Boring	Measuring Instruments
Milling-Machine Work	Precision Measurements

See remarks under Shop Practice Course, on this page.

**Shop Practice, Toolmaking Division—M J; C S J**

Reading Working Drawings (Optional)	Toolmaking
Arithmetic	Gauges and Gauge Making
Measuring Instruments	Dies and Die Making
Precision Measurements	Jigs and Jig Making
General Tool-Room Work*	Shop Hints (Optional)

See remarks under Shop Practice Course, on this page.

**Shop Practice, Patternmaking Division—M K; C S K**

Reading Working Drawings (Optional)	Pattern-Shop Equipment†
Arithmetic	Patternmaking
Wood Working	Gear Calculations (Optional)
Wood Turning	Shop Hints (Optional)

Measuring Instruments  
See remarks under Shop Practice Course, on this page.

**Shop Practice, Foundry-Work Division—M N; C S N**

Reading Working Drawings (Optional)	Mixing Cast Iron
Arithmetic	Machine Molding
Molding in General**	Foundry Appliances
Green-Sand Molding	Malleable Casting
Core Making	Brass Founding
Dry-Sand and Loam Work	Shop Hints (Optional)
Cupola Practice	Measuring Instruments

See remarks under Shop Practice Course, on this page.

**Shop Practice, Blacksmithing and Forging Division—M O; C S O; M O X**

Reading Working Drawings (Optional)	Treatment of Low-Carbon Steel
Arithmetic	Hammer Work
Blacksmith-Shop Equipment	Machine Forging
Iron Forging	Special Forging Operations
Tool Dressing	Shop Hints (Optional)
Hardening and Tempering	Measuring Instruments

See remarks under Shop Practice Course, on this page.

**Shop Practice, Combinations of Two, Three, or Four Divisions**

Any combination of two, three, or four of the five divisions of the Shop Practice Course includes the subjects of each division, except that subjects common to the divisions taken are not duplicated. To indicate the divisions taken, the following letters are annexed to the

\*Printed under the title of Toolmaking, Part 1.

†Printed under the title of Patternmaking, Part 1.

\*\*Printed under the title of Green-Sand Molding, Part 1.

## LIST OF SUBJECTS

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class letters **CS** or **MH**; for Machine-Shop Division, **F**; for Toolmaking Division, **J**; for Patternmaking Division, **K**; for Foundry-Work Division, **N**; for Blacksmithing and Forging Division, **O**.

### Farm Machinery-- M Q; H T

Arithmetic	Mechanics
Mensuration	Traction and Portable Engines
	Farm Machinery

### Refrigeration—M S; H R

Arithmetic	Pneumatics
Mensuration	Heat
Elementary Algebra and Trigonometric Functions	Steam and Steam Engines
Logarithms	Principles of Refrigeration
Elementary Mechanics	Ice-Making and Refrigeration Machinery
	Geometrical Drawing, 9 P. (Optional)
	Mechanical Drawing, 7 P. (Optional)

### Complete Gas Engines—M R X

Arithmetic	Gas-Engine Details
Formulas	Gas-Engine Lubrication and Bearings
Mensuration	Carbureters
Logarithms	Elementary Principles of Electricity
Principles of Mechanics	Electric Ignition Devices
Machine Elements	Automobile- and Marine-Engine Auxiliaries
Mechanics of Fluids	Power-Gas Producers
Heat	Management of Automobile Engines
Combustion and Fuels	Management of Marine Gas Engines
Principles of the Gas Engine	Management of Stationary Gas Engines
Automobile and Marine Engines	Troubles and Remedies
Stationary Gas Engines	Power Determinations

### Gas Engines, Automobile Division—M X

Arithmetic	Automobile and Marine Engines
Formulas	Gas-Engine Details
Mensuration	Gas-Engine Lubrication and Bearings
Logarithms	Carbureters
Principles of Mechanics	Elementary Principles of Electricity
Machine Elements	Electric Ignition Devices
Mechanics of Fluids	Automobile- and Marine-Engine Auxiliaries
Heat	Management of Automobile Engines
Combustion and Fuels	Troubles and Remedies
Principles of the Gas Engine	Power Determinations

### Gas Engines, Marine Division—M Y

Arithmetic	Automobile and Marine Engines
Formulas	Gas-Engine Details
Mensuration	Gas-Engine Lubrication and Bearings
Logarithms	Carbureter
Principles of Mechanics	Elementary Principles of Electricity
Machine Elements	Electric Ignition Devices
Mechanics of Fluids	Automobile- and Marine-Engine Auxiliaries
Heat	Management of Marine Gas Engines
Combustion and Fuels	Troubles and Remedies
Principles of the Gas Engine	Power Determinations

### Gas Engines, Stationary Division—M Z

Arithmetic	Stationary Gas Engines
Formulas	Gas-Engine Details
Mensuration	Gas-Engine Lubrication and Bearings
Logarithms	Carbureters
Principles of Mechanics	Elementary Principles of Electricity
Machine Elements	Electric Ignition Devices
Mechanics of Fluids	Power-Gas Producers
Heat	Management of Stationary Gas Engines
Combustion and Fuels	Troubles and Remedies
Principles of the Gas Engine	Power Determinations

B!

## LIST OF SUBJECTS

## Full Mining—N A; F

Arithmetic	Surface Arrangements at Anthracite Mines
Geometrical Drawing, 9 P.	Preparation of Anthracite
Formulas	Compressed-Air Coal-Cutting Machinery
Geometry and Trigonometry	Percussive and Rotary Boring
Mine Surveying and Mapping, 5 P.	Elements of Electricity and Magnetism*
Gases Met With in Mines	Dynamos and Motors
Mine Ventilation	Electric Hoisting and Haulage
Economic Geology of Coal	Electric Pumping, Signaling, and Lighting
Prospecting for Coal	Electric Coal-Cutting Machinery
Shafts, Slopes, and Drifts	Blowpiping
Methods of Working Coal Mines	Mineralogy
Mechanics	Assaying
Steam and Steam Boilers	Geology
Steam Engines	Prospecting
Air Compression	Placer and Hydraulic Mining
Hydromechanics and Pumping	Preliminary Operations at Metal Mines
Mine Haulage	Metal Mining
Hoisting and Hoisting Appliances	Surface Arrangements at Metal Mining
Surface Arrangements at Bituminous Mines	Ore Dressing and Milling

With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; and new Papers were added, the scope of the Course as a whole being increased.

## Complete Coal Mining—N B X

Arithmetic	Elements of Electricity and Magnetism
Formulas	Direct-Current Dynamos and Motors
Logarithms	Alternating-Current Machinery
Geometry and Trigonometry	Operation of Dynamo-Electric Machinery
Geometrical Drawing, 9 P.	Transmission, Lighting, and Signaling
Mine Surveying, 4 P.	Coal-Cutting Machinery
Properties of Gases	Trackwork
Mine Gases	Timbering
Mine Ventilation	Timber Trees
Geology of Coal	Hoisting
Examination of Coal Properties	Haulage
Rock Boring	Hydromechanics
Rock Drilling	Mine Drainage
Blasting and Explosives	Mine Pumps
Drifts, Shafts, and Slopes	Surface Arrangements at Bituminous Mines
Methods of Working	Surface Arrangements at Anthracite Mines
Mechanics	Preparation of Anthracite
Fuels	Coal Washing
Steam and Steam Boilers	Principles of Coking
Steam Engines	Coking in the Beehive Oven
Air Compression	By-Product Coking

First Aid to the Injured

## Metal Mining—N C; M M

Arithmetic	Preliminary Operations at Metal Mines
Geometrical Drawing, 9 P.	Metal Mining
Formulas	Surface Arrangements at Metal Mines
Geometry and Trigonometry	Ore Dressing and Milling
Mine Surveying and Mapping, 5 P.	Mechanics
Blowpiping	Steam and Steam Boilers
Mineralogy	Steam Engines
Assaying	Air and Air Compression
Geology	Hydromechanics and Pumping
Prospecting	Mine Haulage
Placer and Hydraulic Mining	Hoisting and Hoisting Appliances

Percussive and Rotary Boring

With the adoption of the present order of studies some titles were changed; and the subject matter rearranged to a considerable extent, the scope of the Course as a whole being increased.

## Short Coal Mining—N F; G

Arithmetic	Prospecting for Coal
Mensuration and Trigonometric Functions	Shafts, Slopes, and Drifts
Gases Met With in Mines	Methods of Working Coal Mines
Mine Ventilation	Mine Surveying
Economic Geology of Coal	Mine Machinery

\*Printed under the title of Dynamos and Motors, Part 1.

## Metal Prospectors'—N H; M P

Blowpiping	Geology
Mineralogy	Prospecting
Assaying	Placer and Hydraulic Mining

## Complete Metallurgy—N I

Arithmetic	Assaying
Mensuration	Surface Arrangements at Reduction Works
Elementary Algebra and Trigonometric Functions	Ore Dressing and Milling
Mechanics	Sampling Ores
Steam and Steam Boilers	Roasting and Calcining Ores
Steam Engines	The Cyanide Process
Hydraulics and Hydraulic Machinery	Hyposulphite Lixiviation
Elementary Chemistry	The Chlorination Process
Chemistry and Chemical Operations	Copper Smelting and Refining
Blowpiping	Lead Smelting and Refining
Mineralogy	Zinc Smelting and Refining
	Electrometallurgy

## Hydrometallurgy—N J

Arithmetic	Blowpiping
Mensuration	Mineralogy
Elementary Algebra and Trigonometric Functions	Assaying
Mechanics	Surface Arrangements at Reduction Works
Steam and Steam Boilers	Ore Dressing and Milling
Steam Engines	Sampling Ores
Hydraulics and Hydraulic Machinery	Roasting and Calcining Ores
Elementary Chemistry	The Cyanide Process
Chemistry and Chemical Operations	Hyposulphite Lixiviation
	The Chlorination Process
	Electrometallurgy

## Smelting—N K

Arithmetic	Chemistry and Chemical Operations
Mensuration	Blowpiping
Elementary Algebra and Trigonometric Functions	Mineralogy
Mechanics	Assaying
Steam and Steam Boilers	Surface Arrangements at Reduction Works
Steam Engines	Sampling Ores
Hydraulics and Hydraulic Machinery	Roasting and Calcining Ores
Elementary Chemistry	Copper Smelting and Refining
	Lead Smelting and Refining
	Zinc Smelting and Refining

## Milling—N L

Arithmetic	Elementary Chemistry
Mensuration	Chemistry and Chemical Operations
Elementary Algebra and Trigonometric Functions	Blowpiping
Mechanics	Mineralogy
Steam and Steam Boilers	Assaying
Steam Engines	Surface Arrangements at Reduction Works
Hydraulics and Hydraulic Machinery	Ore Dressing and Milling
	Sampling Ores

## Complete Plumbing and Heating—P H

Arithmetic	Pipework
Mensuration	Washing and Drinking Fixtures
Principles of Mechanics	Baths and Urinals
Hydromechanics	Water Closets
Pneumatics	House Drains
Strength of Materials	Soil, Waste, and Vent Stacks
Elementary Chemistry	Traps and Vents
Gas Making	Drainage and Sewerage
Gas Supply and Distribution	Sewage Disposal
Domestic Uses of Gas	Sources of Water Supply
Plumbing Materials and Tools	Water Filtration
Soldering and Wiping	Cold-Water Supply
Lead Work	Hot-Water Supply

## Complete Plumbing and Heating—P H (Continued)

Plumbing Inspection	Hot-Water Heating Systems
Plumbing Plans and Specifications	Hot-Water Heating Apparatus
Pipes and Fittings	Central-Station Heating
Steam-Fitting Accessories	Hot-Air Heating
Radiators and Coils	Blower Systems
Heating and Power Boilers	Drying and Cooking by Steam
Boiler Fittings	Engine-Room Equipment
Principles of Heating	High-Pressure Pipe Fitting
Principles of Ventilation	Heating Plans and Specifications
Steam Generation	Contracts
Pipe-Fitting Tools	Geometrical Drawing, 9 P.
Pipe-Fitting Practice	Principles of Mechanical Drawing, 2 P.
Steam-Heating Pipe Systems	Plumbing and Heating Drawings, 8 P.
Exhaust and Vacuum Systems	Reading Architects' Drawings

## Complete Plumbing—P I

Arithmetic	Water Closets
Mensuration	House Drains
Principles of Mechanics	Soil, Waste, and Vent Stacks
Hydromechanics	Traps and Vents
Pneumatics	Drainage and Sewerage
Strength of Materials	Sewage Disposal
Elementary Chemistry	Sources of Water Supply
Gas Making	Water Filtration
Gas Supply and Distribution	Cold-Water Supply
Domestic Uses of Gas	Hot-Water Supply
Plumbing Materials and Tools	Plumbing Inspection
Soldering and Wiping	Plumbing Plans and Specifications
Lead Work	Contracts
Pipework	Geometrical Drawing, 9 P.
Washing and Drinking Fixtures	Principles of Mechanical Drawing, 2 P.
Baths and Urinals	Plumbing and Heating Drawings, 8 P.
	Reading Architects' Drawings

## Complete Heating—P J

Arithmetic	Steam-Heating Pipe Systems
Mensuration	Exhaust and Vacuum Systems
Principles of Mechanics	Drying and Cooking by Steam
Hydromechanics	Hot-Water Heating Apparatus
Pneumatics	Hot-Water Heating Systems
Strength of Materials	Central-Station Heating
Pipes and Fittings	Hot-Air Heating
Steam-Fitting Accessories	Blower Systems
Radiators and Coils	Engine-Room Equipment
Heating and Power Boilers	High-Pressure Pipe Fitting
Boiler Fittings	Heating Plans and Specifications
Principles of Heating	Contracts
Principles of Ventilation	Geometrical Drawing, 9 P.
Steam Generation	Principles of Mechanical Drawing, 2 P.
Pipe-Fitting Tools	Plumbing and Heating Drawings, 8 P.
Pipe-Fitting Practice	Reading Architects' Drawings

## Plumbers and Steam Fitters—P K

Arithmetic (Optional)	Soil, Waste, and Vent Stacks
Mensuration (Optional)	Traps and Vents
Principles of Mechanics (Optional)	Cold-Water Supply
Hydromechanics (Optional)	Hot-Water Supply
Pneumatics (Optional)	Pipes and Fittings
Strength of Materials (Optional)	Steam-Fitting Accessories
Plumbing Materials and Tools	Radiators and Coils
Soldering and Wiping	Heating and Power Boilers
Lead Work	Boiler Fittings
Pipework	Steam Generation
Washing and Drinking Fixtures	Pipe-Fitting Tools
Baths and Urinals	Pipe-Fitting Practice
Water Closets	Steam-Heating Pipe Systems
House Drains	Exhaust and Vacuum Systems
	Reading Architects' Drawings

**Steam Fitters'—P M**

Arithmetic (Optional)	Radiators and Coils
Mensuration (Optional)	Heating and Power Boilers
Principles of Mechanics (Optional)	Boiler Fittings
Hydromechanics (Optional)	Steam Generation
Pneumatics (Optional)	Pipe-Fitting Tools
Strength of Materials (Optional)	Pipe-Fitting Practice
Pipes and Fittings	Steam-Heating Pipe Systems
Steam-Fitting Accessories	Exhaust and Vacuum Systems

**Short Plumbing—P O**

Arithmetic (Optional)	Pipework
Mensuration (Optional)	Washing and Drinking Fixtures
Principles of Mechanics (Optional)	Baths and Urinals
Hydromechanics (Optional)	Water Closets
Pneumatics (Optional)	House Drains
Strength of Materials (Optional)	Soil, Waste, and Vent Stacks
Plumbing Materials and Tools	Traps and Vents
Soldering and Wiping	Cold-Water Supply
Lead Work	Hot-Water Supply

**Plumbing Inspectors'—P T**

Arithmetic (Optional)	Water Closets
Mensuration (Optional)	House Drains
Principles of Mechanics (Optional)	Soil, Waste, and Vent Stacks
Hydromechanics (Optional)	Traps and Vents
Pneumatics (Optional)	Drainage and Sewerage
Strength of Materials (Optional)	Sewage Disposal
Elementary Chemistry	Cold-Water Supply
Plumbing Materials and Tools	Hot-Water Supply
Soldering and Wiping	Plumbing Inspection
Lead Work	Plumbing Plans and Specifications
Pipework	Geometrical Drawing
Washing and Drinking Fixtures	Principles of Mechanical Drawing
Baths and Urinals	Plumbing and Heating Drawings
	Reading Architects' Drawings

**Locomotive Running, Complete—R L; L R; R D****Locomotive Running, Division 3—R O**

Air-Brake Pumps	Vauclain Compound Locomotives
Triple Valves and Brake Valves	Cross-Compound Locomotives
Air-Brake Troubles	Tandem and Balanced Compound Locomotives
Operating and Testing Trains	Car Lighting (Optional)
Foundation Brake Gear	Car Heating (Optional)
Air Signal System	Electric Headlight (Optional)
High-Speed Brake	New York Air-Brake Pumps (Optional)
Locomotive Boilers	New York Triple Valves and Brake Valves (Optional)
Boiler Attachments	New York Air-Brake Troubles (Optional)
Heat and Steam	Train Operation (Optional)
The Locomotive	New York Foundation Brake Gear (Optional)
Valves and Valve Gears	New York Air Signal and High-Speed Brake (Optional)
Locomotive Management	Arithmetic (Optional)
Breakdowns	
Train Rules	

With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged, and new papers were added; the scope of the Course as a whole being increased.

**Complete Air Brake—R R; A B; R G****Air Brake, Division 1—R S**

Air-Brake Pumps	New York Air-Brake Pumps (Optional)
Triple Valves and Brake Valves	New York Triple Valves and Brake Valves (Optional)
Air-Brake Troubles	New York Air-Brake Troubles (Optional)
Operating and Testing Trains	Train Operation (Optional)
Foundation Brake Gear	New York Foundation Brake Gear (Optional)
Air-Signal System	
High-Speed Brake	
	New York Air-Signal and High-Speed Brake (Optional)

See remarks under Locomotive Running, Complete, on this page.



Complete Trainmen and Carmen's—R V; T R; R F  
Trainmen and Carmen's, Division 1—R W

Westinghouse Air-Brake Construction*	New York Air-Brake Operation†
Westinghouse Air-Brake Defects*	New York Signal Apparatus†
Westinghouse Air-Brake Operation*	New York High-Pressure Control†
Westinghouse Signal Apparatus*	Train Rules
Westinghouse High-Speed Air Brake*	Car Lighting
New York Air-Brake Construction†	Car Heating
New York Air-Brake Defects†	Arithmetic (Optional)

The study of either air-brake system is optional.

Roundhouse, Division 1—R Y A

Locomotive Boilers	Air-Brake Troubles
Boiler Attachments	Operating and Testing Trains
Air-Brake Pumps	Foundation Brake Gear
Triple Valves and Brake Valves	Air-Signal System

High-Speed Brake

See remarks under Locomotive Running, Complete, on page 21.

Roundhouse, Division 2—R Y B

Locomotive Boilers	New York Air-Brake Troubles
Boiler Attachments	Train Operation
New York Air-Brake Pumps	New York Foundation Brake Gear
New York Triple Valves and Brake Valves	New York Air-Signal and High-Speed Brake

See remarks under Locomotive Running, Complete, on page 21.

Roundhouse, Division 3—R Y C

Locomotive Boilers	Boiler Attachments
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See remarks under Locomotive Running, Complete, on page 21.

Grammar and Letter Writing—S B F

English Grammar	Punctuation and Capitalization
	Letter Writing

Corporation Organization, Cost Accounting, and Bank Bookkeeping—S B I

Corporation Organization and Bookkeeping	Elements of Cost Accounting
	Bank Bookkeeping

Plain Show-Card Writing—S B P

Show-Card Writing	Letter Formation, 10 P.
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Complete Cotton—T A; T A A

Arithmetic	Beam Warpers
Mensuration	Chain Warping
Yarn Calculations, Cotton	Slashers
Cloth Calculations, Cotton	Plain Looms
Mechanical Definitions	Fixing Looms
Mechanical Calculations	Loom Attachments
Reading Textile Drawings	Automatic Looms
Draft Calculations	Dobbies
Cotton	Leno Attachments
Pickers	Box Motions
Cotton Cards	Jacquards
Drawing Rolls	Cloth Rooms
Railway Heads and Drawing Frames	Glossary of Weaves
Combers	Elementary Textile Designing
Fly Frames	Analysis of Cotton Fabrics
Ring Frames	Twill Weaves and Derivatives
Cotton Mules	Satin and Other Weaves
Twisters	Combination Weaves
Yarns	Construction of Spot Weaves
Reeling and Baling	Weaves for Backed Cotton Fabrics
Winding	Leno Weaves
Spoolers	Pile Weaves

\*Printed under the general title of The Air Brake, in 4 parts.

†Printed under the general title of The New York Air Brake, in 4 parts.



## Complete Textile Designing—T F; T A F (Continued)

Fixing Looms	Elementary Textile Designing
Loom Attachments	Analysis of Cotton Fabrics
Automatic Looms	Analysis of Woolen and Worsted Fabrics
Dobbies	Twill Weaves and Derivatives
Leno Attachments	Satin and Other Weaves
Box Motions	Combination Weaves
Cloth Rooms	Construction of Spot Weaves
Woolen and Worsted Warp Preparation	Weaves for Backed Cotton Fabrics
Woolen and Worsted Cam-Looms	Woolen and Worsted Ply Weaves
Woolen and Worsted Fancy Looms	Leno Weaves
Woolen and Worsted Loom Fixing	Pile Weaves
Jacquards	Designing in General
Glossary of Weaves	Color in Textile Designing

See remarks under Complete Cotton, on page 22.

## Theory of Textile Designing—T G; T A G

Arithmetic	Twill Weaves and Derivatives
Yarn Calculations, General	Satin and Other Weaves
Cloth Calculations, Cotton	Combination Weaves
Yarn Calculations, Woolen and Worsted	Construction of Spot Weaves
Yarns	Weaves for Backed Cotton Fabrics
Glossary of Weaves	Woolen and Worsted Ply Weaves
Elementary Textile Designing	Leno Weaves
Analysis of Cotton Fabrics	Pile Weaves
Analysis of Woolen and Worsted Fabrics	Designing in General
	Color in Textile Designing

See remarks under Complete Cotton, on page 22.

## Cotton Designing—T H; T A H

Arithmetic	Dobbies
Mensuration	Leno Attachments
Yarn Calculations, Cotton	Box Motions
Cloth Calculations, Cotton	Jacquards
Mechanical Definitions	Cloth Rooms
Mechanical Calculations	Glossary of Weaves
Reading Textile Drawings	Elementary Textile Designing
Yarns	Analysis of Cotton Fabrics
Spoolers	Twill Weaves and Derivatives
Beam Warpers	Satin and Other Weaves
Chain Warping	Combination Weaves
Slashers	Construction of Spot Weaves
Plain Looms	Weaves for Backed Cotton Fabrics
Fixing Looms	Leno Weaves
Loom Attachments	Pile Weaves
Automatic Looms	Designing in General
	Color in Textile Designing

See remarks under Complete Cotton, on page 22.

## Woolen and Worsted Designing—T I; T A I

Arithmetic	Woolen and Worsted Loom Fixing
Mensuration	Jacquards
Yarn Calculations, Woolen and Worsted	Glossary of Weaves
Cloth Calculations, Woolen and Worsted	Elementary Textile Designing
Mechanical Definitions	Analysis of Woolen and Worsted Fabrics
Mechanical Calculations	Twill Weaves and Derivatives
Reading Textile Drawings	Satin and Other Weaves
Yarns	Combination Weaves
Woolen and Worsted Warp Preparation	Construction of Spot Weaves
Woolen and Worsted Cam-Looms	Woolen and Worsted Ply Weaves
Woolen and Worsted Fancy Looms	Pile Weaves
	Color in Textile Designing

See remarks under Complete Cotton, on page 22.

## Complete Woolen—T J; T A J

Arithmetic	Mechanical Definitions
Mensuration	Mechanical Calculations
Yarn Calculations, Woolen and Worsted	Reading Textile Drawings
Cloth Calculations, Woolen and Worsted	Wool

## Complete Woolen—T J; T A J (Continued)

Wool Scouring	Woolen and Worsted Loom Fixing
Wool Drying	Glossary of Weaves
Burr Picking	Elementary Textile Designing
Carbonizing	Analysis of Woolen and Worsted Fabrics
Wool Mixing	Twill Weaves and Derivatives
Wool Oiling	Satin and Other Weaves
Woolen Carding	Combination Weaves
Woolen Spinning	Construction of Spot Weaves
Yarns	Woolen and Worsted Ply Weaves
Woolen and Worsted Warp Preparation	Pile Weaves
Woolen and Worsted Cam-Looms	Color in Textile Designing
Woolen and Worsted Fancy Looms	Mill Engineering

See remarks under Complete Cotton, on page 22.

## Woolen Carding and Spinning—T K; T A K

Arithmetic	Wool Drying
Mensuration	Burr Picking
Yarn Calculations, Woolen and Worsted	Carbonizing
Mechanical Definitions	Wool Mixing
Mechanical Calculations	Wool Oiling
Reading Textile Drawings	Woolen Carding
Wool	Woolen Spinning
Wool Scouring	Yarns

See remarks under Complete Cotton, on page 22.

## Woolen Warp Preparation and Weaving—T L; T A L

Arithmetic	Reading Textile Drawings
Mensuration	Yarns
Yarn Calculations, Woolen and Worsted	Woolen and Worsted Warp Preparation
Cloth Calculations, Woolen and Worsted	Woolen and Worsted Cam-Looms
Mechanical Definitions	Woolen and Worsted Fancy Looms
Mechanical Calculations	Woolen and Worsted Loom Fixing

See remarks under Complete Cotton, on page 22.

## Yarn Reeling, Warping, and Winding—T M; T A M

Arithmetic	Twisters
Mensuration	Reeling and Baling
Yarn Calculations, General	Winding
Mechanical Definitions	Spoolers
Mechanical Calculations	Beam Warpers
Reading Textile Drawings	Chain Warping
Yarns	Woolen and Worsted Warp Preparation

See remarks under Complete Cotton, on page 22.

## Worsted Warp Preparation and Weaving—T N; T A N

Arithmetic	Reading Textile Drawings
Mensuration	Yarns
Yarn Calculations, Woolen and Worsted	Woolen and Worsted Warp Preparation
Cloth Calculations, Woolen and Worsted	Woolen and Worsted Cam-Looms
Mechanical Definitions	Woolen and Worsted Fancy Looms
Mechanical Calculations	Woolen and Worsted Loom Fixing

## Jacquards

See remarks under Complete Cotton, on page 22.

## Woolen Carding, Spinning, and Weaving—T O; T A O

Arithmetic	Burr Picking
Mensuration	Carbonizing
Yarn Calculations, Woolen and Worsted	Wool Mixing
Cloth Calculations, Woolen and Worsted	Wool Oiling
Mechanical Definitions	Woolen Carding
Mechanical Calculations	Woolen Spinning
Reading Textile Drawings	Yarns
Wool	Woolen and Worsted Warp Preparation
Wool Scouring	Woolen and Worsted Cam-Looms
Wool Drying	Woolen and Worsted Fancy Looms

## Woolen and Worsted Loom Fixing

See remarks under Complete Cotton, on page 22.

**LIST OF SUBJECTS  
IN  
ABOLISHED COURSES OF INSTRUCTION**

The Courses listed below were sold for a time and subsequently withdrawn.

**Air Brake, Division 3—R Z A**

Westinghouse Air-Brake Construction*	Westinghouse Air-Brake Operation*
Westinghouse Air-Brake Defects*	Westinghouse Signal Apparatus*
Westinghouse High-Speed Air Brake*	

**Air Brake, Division 4—R Z B**

New York Air-Brake Construction**	New York Air-Brake Operation **
New York Air-Brake Defects**	New York Signal Apparatus**
New York High-Pressure Control**	

**Architectural Drawing—D L; D M; U D; L D**

Arithmetic	Geometrical Drawing, 9 P.
Formulas	Architectural Drawing, 12 P.
Geometry and Mensuration	Ornamental Drawing, 6 P.
Advanced Architectural Drawing, 18 P. (10 Plates optional)	

**Architectural Drawing—U**

Arithmetic	Geometry and Mensuration
Formulas	Geometrical Drawing, 9 P.
Architectural Drawing, 12 P.	

**Bookkeeping and Business Forms—B E; X**

Arithmetic	Single-Entry Bookkeeping
Slanting Penmanship	Double-Entry Bookkeeping
Vertical Penmanship	Opening, Closing, and Changing Books
Modern Office Methods†	

Either part of Penmanship is optional.

**Chemistry—L**

Arithmetic	Theoretical Chemistry
Elementary Algebra and Trigonometric Functions	Inorganic Chemistry
Physics	Qualitative Analysis
	Organic Chemistry

**Complete Commercial—B A; C C**

Arithmetic	Letter Writing
Spelling	Single-Entry Bookkeeping
Slanting Penmanship	Double-Entry Bookkeeping
Vertical Penmanship	Opening, Closing, and Changing Books
Grammar	Modern Office Methods†
Punctuation and Capitalization†	Stenography
Either part of Penmanship is optional.	

**Complete Locomotive—H C R O**

This Course is a combination of the Locomotive Engineering and Locomotive Running, Division 3, Courses, given on pages 21 and 27.

**Complete Stenographic—B B; A A**

Spelling	Grammar
Slanting Penmanship	Punctuation and Capitalization†
Vertical Penmanship	Letter Writing
Stenography	

Either part of Penmanship is optional.

\*Printed under the general title of The Air Brake, in 4 parts.

\*\*Printed under the general title of The New York Air Brake, in 4 parts.

†Formerly not included in this Course.

LIST OF SUBJECTS IN ABOLISHED COURSES 27

Drawing, Sketching, and Perspective—D E; D F; P D; O O

Geometrical Drawing, 9 P.	Elements of Perspective
Freehand Drawing, 6 P.	Perspective Drawing, 4 P.
Historic Ornament	Color Harmony, 2 P.††

Electric Lighting—E J; J J

Arithmetic	Mechanics
Geometrical Drawing, 9 P. (Optional)	Elements of Electricity and Magnetism*
Mechanical Drawing, 7 P. (Optional)	Dynamos and Motors
Mensuration	Electric Lighting

Electric Power and Lighting—E I; J

Arithmetic	Mechanics
Geometrical Drawing, 9 P. (Optional)	Elements of Electricity and Magnetism*
Mechanical Drawing, 7 P. (Optional)	Dynamos and Motors
Mensuration	Electric Lighting

Electric Railways

Electric Railways—E K; J R

Arithmetic	Mechanics
Geometrical Drawing, 9 P. (Optional)	Elements of Electricity and Magnetism*
Mechanical Drawing, 7 P. (Optional)	Dynamos and Motors
Mensuration	Electric Railways

Fancy Woolen Weaving—T T

Arithmetic	Fixing Looms
Mensuration	Loom Attachments
Mechanical Definitions and Calculations	Automatic Looms
Yarn Calculations	Dobbies
Woolen and Worsted Cloth Calculations	Leno Attachments
Woolen and Worsted Warp Preparation	Box Motions
Plain Looms	Jacquards

See remarks under Complete Cotton Course, on page 22.

Inorganic and Organic Chemistry—O

Arithmetic	Physics
Elementary Algebra and Trigonometric Functions	Theoretical Chemistry
	Inorganic Chemistry
	Organic Chemistry

Locomotive Engineering—H C; H L

Arithmetic	Mechanical Drawing, 7 P. (Optional)
Mensuration	Locomotives
Mechanics	Elements of Electricity and Magnetism*
Geometrical Drawing, 9 P. (Optional)	Dynamos and Motors

Locomotive Running, Division 1—R M

Locomotive Running, Division 2—R N

Locomotive Boilers	Compound Locomotives
Steam, Cylinders, and Valve Gears	Train Rules
Locomotive Management	Car Lighting (Optional)
Breakdowns	Car Heating (Optional)

Electric Headlight (Optional)

Division 1 includes a set of Mitchell's Models, illustrative of Westinghouse Air-Brake Apparatus.

Locomotive Running, Division 4—R P

Steam, Cylinders, and Valve Gears	Breakdowns
Locomotive Management	Compound Locomotives

Mathematics and Physics—I E; W

Arithmetic	Algebra
Geometry and Trigonometry	Logarithms
Elementary Mechanics	Pneumatics
Hydromechanics	Heat

††Not counted as a separate subject, but credit is given for Plates drawn by student.

\*Printed under the title of Dynamos and Motors, Part 1.

28 LIST OF SUBJECTS IN ABOLISHED COURSES

**Mechanical Drawing—D K; D J; E D; M D**

Arithmetic	Geometrical Drawing, 9 P.
Mensuration	Mechanical Drawing, 16 P.

Algebra, Geometry and Trigonometry, Elementary Mechanics, Hydromechanics, Pneumatics, and Heat, were for a time included in this Course. Students having class letter **M D** and a number below 441 were entitled to these subjects.

**Mechanical Drawing—D O; D P**

Arithmetic	Mechanical Drawing, 16 P.
Mensuration	Practical Projection, 7 P. (Optional)
Geometrical Drawing, 9 P.	Development of Surfaces, 5 P. (Optional)

**Mechanical Locomotive—M L; R A; R B; R C**

This Course includes all the subjects of the Mechanical and Locomotive Running, Division 3, Courses, given on pages 15 and 21.

**Mine Mechanical—M**

Arithmetic	Hoisting and Hoisting Appliances
Geometrical Drawing, 9 P.	Surface Arrangements at Bituminous Mines
Mechanical Drawing, 6 P.	Surface Arrangements at Anthracite Mines
Mensuration	Compressed-Air Coal-Cutting Machinery
Mechanics	Percussive and Rotary Boring
Steam and Steam Boilers	Elements of Electricity and Magnetism*
Steam Engines	Dynamos and Motors
Air and Air Compression	Electric Hoisting and Haulage
Hydromechanics and Pumping	Electric Pumping, Signaling, and Lighting
Mine Haulage	Electric Coal-Cutting Machinery

With the adoption of the order of studies here given some titles were changed; the subject matter was rearranged to a considerable extent; and new Papers were added.

**Ornamental Design—D A; D B; B D; C D**

Geometrical Drawing, 5 P.	Practical Design
Freehand Drawing, 6 P.	Applied Design
Historic Ornament	Historic Ornamental Drawing, 5 P.
Elements of Ornament	Color Harmony, 2 P.†

**Roundhouse—R H**

Locomotive Boilers	Westinghouse High-Speed Air Brake‡
Westinghouse Air-Brake Construction †	New York Air-Brake Construction**
Westinghouse Air-Brake Defects‡	New York Air-Brake Defects**
Westinghouse Air-Brake Operation‡	New York Air-Brake Operation**
Westinghouse Signal Apparatus‡	New York Signal Apparatus**
	New York High-Pressure Control**

Study of either air-brake system is optional.

**Silk Designing—T M A**

Arithmetic	Leno Attachments
Mensuration	Box Motions
Mechanical Definitions and Calculations	Jacquards
Yarn Calculations	Definitions of Designing
Plain Looms	Cloth Analysis
Fixing Looms	Twills and Satins
Loom Attachments	Combinations of Weaves
Automatic Looms	Cotton Fabrics
Dobbies	Color in Textile Designing

**Designer's Requirements**

See remarks under Complete Cotton Course on page 22.

**Stationary Engineers'—H A; H S**

Arithmetic	Steam Engine Mechanism††
Geometrical Drawing, 9 P. (Optional)	Steam and Steam Engines
Mechanical Drawing, 8 P. (Optional)	Steam Boilers
Mensuration	Elements of Electricity and Magnetism††
Mechanics	Dynamos and Motors

\*Printed under the title of Dynamos and Motors, Part 1.

‡Not counted as a separate subject, but credit is given for Plates drawn by student.

†Printed under the general title of The Air Brake, in 4 parts.

\*\*Printed under the general title of The New York Air Brake, in 4 parts.

††Printed under the title of Steam and Steam Engines, Part 1.





30 LIST OF SUBJECTS IN ABOLISHED COURSES

**Electrical Engineering—E W; E A; M E (Continued)**

Formulas is not sent to students taking Algebra directly after Arithmetic. With the adoption of the present order of studies the titles of some electrical Papers were changed; the subject matter of the electrical Papers was to a considerable extent rearranged; and new Papers were added, the scope of the electrical part of the Course being increased. The option of taking Practical Projection and Development of Surfaces is regularly given to students having class letters E W.

**Complete Coal Mining—N B; C M**

Arithmetic	Air and Air Compression
Geometrical Drawing, 9 P.	Hydromechanics and Pumping
Formulas	Mine Haulage
Geometry and Trigonometry	Hoisting and Hoisting Appliances
Mine Surveying and Mapping, 5 P.	Surface Arrangements at Bituminous Mines
Gases Met With in Mines	Surface Arrangements at Anthracite Mines
Mine Ventilation	Preparations of Anthracite
Economic Geology of Coal	Compressed-Air Coal-Cutting Machinery
Prospecting for Coal	Percussive and Rotary Boring
Shafts, Slopes, and Drifts	Principles of Electricity and Magnetism*
Methods of Working Coal Mines	Dynamos and Motors
Mechanics	Electric Hoisting and Haulage
Steam and Steam Boilers	Electric Pumping, Signaling, and Lighting
Steam Engines	Electric Coal-Cutting Machinery

With the adoption of the present order of studies some titles were changed; the subject matter was to a considerable extent rearranged; and new Papers were added, the scope of the Course as a whole being increased.

**Surveying and Mapping—G C; S M**

Arithmetic	Geometrical Drawing, 9 P.
Formulas	Surveying
Geometry and Trigonometry	Land Surveying
	Mapping, 6 P.

Algebra and Logarithms were formerly included in this Course.

**Sanitary Plumbing, Heating, and Ventilation—P A; P**

Arithmetic	Gas and Gas-Fitting
Geometrical Drawing, 9 P.	Electric-Light Wiring and Bell Work
Mechanical Drawing, 10 P.	Principles of Heating and Ventilation
Mensuration	Steam Heating
Mechanics	Hot-Water Heating
Plumbing Materials and Tools†	Furnace Heating
Plumbing and Drainage	Ventilation of Buildings

**Sanitary Plumbing and Gas-Fitting—P B; N**

Arithmetic	Mechanics
Geometrical Drawing, 9 P.	Plumbing Materials and Tools†
Mechanical Drawing, 10 P.	Plumbing and Drainage
Mensuration	Gas and Gas-Fitting
	Electric-Light Wiring and Bellwork

**Sanitary Plumbing—P C; P N**

Arithmetic	Mensuration
Geometrical Drawing, 9 P.	Mechanics
Mechanical Drawing, 10 P. (6 Plates optional)	Plumbing Materials and Tools†
	Plumbing and Drainage

**Gas-Fitting—P F; P P**

Arithmetic	Mensuration
Geometrical Drawing, 9 P.	Mechanics
Mechanical Drawing, 10 P. (6 Plates optional)	Gas and Gas-Fitting
	Electric-Light Wiring and Bellwork

**Heating and Ventilation—P G; K**

Arithmetic	Principles of Heating and Ventilation
Geometrical Drawing, 9 P.	Steam Heating
Mechanical Drawing, 10 P.	Hot-Water Heating
Mensuration	Furnace Heating
Mechanics	Ventilation of Buildings

\*Printed under the title of Dynamos and Motors, Part 1.

†Printed under the title of Plumbing and Drainage, Part 1.

LIST OF SUBJECTS IN ABOLISHED COURSES 31

Civil Service—I H; I K; I L

Arithmetic Spelling Slanting or Vertical Penmanship Letter Writing Geography Double-Entry Bookkeeping Stenography Typewriting Transportation Copying Gauging and Elementary Physics	Speed Shorthand Immigration Law Postal Information Grammar Typesetting and Proofreading Tabulating Title Page Composition Chinese Exclusion Law Journalizing and Business Statements Reading Addresses Copying Addresses
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Comparing Addresses

A student enrolled under class letters I H, I K, or I L is first sent a preliminary examination, the nature and scope of which depends on the position for which he desires to qualify. His work on the preliminary examination will indicate in what subjects he is deficient and what Papers must be used to conduct the instruction. From the above list of subjects the student is then furnished instruction to meet his requirements.

Drawing for Monument Workers—S B Q; D D; D D A

Geometrical Drawing, 9 P.	Elements of Architecture
Freehand Drawing, 6 P.	The Formation of Letters, 10 P.

Mine Surveying and Mapping—S B Z

Arithmetic	Geometry and Trigonometry
Formulas	Geometrical Drawing, 9 P.
	Mine Surveying and Mapping, 5 P.

Stenography and Typewriting—S C R

Stenography	Typewriting
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Bookkeepers'—B G

Double-Entry Bookkeeping	Elements of Cost Accounting
Opening, Closing, and Changing Books	Corporation Organization and Bookkeeping
	Bank Bookkeeping

Assaying—Q

Blowpiping	Mineralogy
	Assaying

Cotton Spinning and Warp Preparation—T Q

Arithmetic	Ring Frames
Mensuration	Cotton Mules
Mechanical Definitions and Calculations	Twisters†
Yarn Calculations	Spoolers
Reading Textile Drawings†	Beam Warpers
Draft Calculations	Chain Warping†
Drawing Rolls	Slashers

†Not included in Course at first.

*Typical section listing students.*

# ARIZONA TERRITORY

Name and Year	Address	C. L. & No.	Record
<b>Towns</b>			
Nicholson, A. J., '03	Acme, MOHAVE	1B 527683	3S
Leeview, H. A., '06	Arlington, 249 Laurel Ave., MARICOPA	GA 875746	5S
Parker, W. A., '00	Ashfork, YAVAPAI	HS 36313	5S
Stevenson, V. V., '02	Ashfork, Postal Tel. and Cable Co., YAVAPAI	EH 54316	6S
Norman, C. S., '06	Benson, COCHISE	AC 938585	8S, 12P
Parks, J. A., '01	Benson, Box 97, COCHISE	BC 1025	1S, 11P
<b>Bisbee, COCHISE</b>			
Alcock, J. A., '00		MM 2269	23S, 14P, D
Austin, C. B., '06	Box 628	BEX 909148	2S
Ayres, H. A., '00		T 1162	13S, 13P
Barkdoll, H., '00	Box 583	MM 1656	5S
Bear, C., '05	Box 576	EAA 809802	22S
Beard, J., '03	Box 1485	LA 524009	8 Parts
Beisel, N. J., '96	% C. Q. C. M. Co.	F 613	21S, 9P
Bowen, Jennie, '03	Box 1113	BB 602017	4S
Claydon, E., '02	Box 823	EP 474391	9S
Conrad, M., '05		NC 804212	8S, 5P
Coombs, H. L., '01	Box 104	F 1900	6S, 1P
Coombs, H. L., '01	Box 517	HS 42734	9S, 12P
Curnow, E. M., '05		EP 793028	11S
Day, H. J., '99	Box 1263	C 21199	4S, 10P
Fenner, H. L., '02	Box 41	NC 462097	12S, 9P
Gillingham, J. W., '00	% Copper Queen Min. Co., Box 272	MM 1496	5S, 11P
Hindman, C. M., '04	Box 1269	NC 627272	5S, 15P
Lawton, G. C., '99		MM 854	6S, 1P
Lee, R., '04		LA 722676	19P
Luig, R. M., '06	Box 698, % Int. Gas and Light Co.	AC 891491	6S, 17P
Marz, G., '03	Box 671	LA 523048	9 Parts
McDonald, C., '00	Box 359	MM 1920	13S, 11P
McKeehan, W. E., '05	Box 155	LA 776876	9 Parts
Merrill, J. G., '02		GC 392666	4S, 9P
Morse, M. B., '05	Box 482	BMX 806826	8S
Nylander, J., '02	Box 938	MO 486277	4S, D
Playfair, D., '00		MM 1914	11S, 12S
Purvis, E. A., '02	19 Mason Hill	MA 401913	9S
Rees, Mrs. F. B., '02	Box 75	BE 488581	6S
Schuck, H. W., '06	Box 351	PK 919870	11S
Selkirk, R. J., '02	192 Brewery Gulch	LA 468037	8P
Shields, T. T., '05		BEX 60728	4S
Skow, A. P. R., '02		NC 446668	4S, 11P
Smith, R. T., '04	Box 654	EV 742116	21S
Speakman, W., '01		MM 2709	8S
Spillane, P., '98	Box 1122	F 907	7S, 3P
Strange, P. G., '06		NA 916836	4S, 12P
Toren, A. R., '03	Box 1658	NI 569874	19S
Vamey, S. J., '01	Box 1234	D 2856	5S
Whisler, W. H., '03	Box 1692	HE 607558	27S, 4P
<b>Towns</b>			
Harrison, T. S., '06	Black Diamond, COCHISE	NA 906795	6S, 9P
Buckalew, C. F., '05	Black Warrior, GILA	NA 795064	35S, 13P
King, A., '02	Blanchard, YAVAPAI	HA 387882	6S
Pellejefo, A. B., '07	Blanchard, YAVAPAI	LO 999865	8 Parts
Grissinger, J. H., '03	Bowie, General Delivery, APACHE	RR 575788	10S, D
Myers, C. D., '94	Casagrande, PINAL	MM 41	10S
Heidenrich, C. F., '97	Cherry Creek, YAVAPAI	HS 3757	4S, 11P
Watrous, P. G., '03	Christmas, GILA	EF 563884	5S, 26P

<i>Name and Year</i>	<i>Address</i>	<i>C. L. &amp; No.</i>	<i>Record</i>
<b>Clifton, GRAHAM</b>			
Anderson, W., '99		MM 1340	6S
Bruce, R. E., '01	Box 361	NC 362946	7S 10P
Davis, E. S., '05	Box 501	BAX 784142	4S
Delano, W. A., '01	Box 361	GA 50578	6S, 13P
Gongalez, B., '06	224 N. Clifton St.	LO 934156	16P
Langford, F., '98		F 776	11S, 7P
Murray, H. T., '04	Box 367	NC 637765	8S, 9P
Pollock, W., '03	Box 108	HE 567086	10S
Serna, M., '06	Box 105	LO 932276	9P
Stirrat, J., '02	Box 354	LA 395444	16 Parts
Stirrat, J., '02	Box 354	NI 457342	9S
Waugh, A., '98		MP 495	3S
Wells, M. H., '00	% Shannon Copper Co.	ME 21348	3S, 26P
<b>Towns</b>			
Scow, O. L., '05	Dos Cabezos, COCHISE	EAA 802397	13S, 2P
<b>Douglas, COCHISE</b>			
Cardwell, W. T., '03		NC 56999	5S, 5P
Carter, S., '07	Box 724	EP 977908	5S
Clark, A. L., '00	% Calumet and Arizona Mining Co.	MM 2111	5S, 10P
Cooper, B. E., '02		HD 487342	10S, 1P
Cupp, C. D., '05	Box 30	BAX 827902	4S
Graves, E. N., '03		EF 581855	18S, 26P, D
Hodges, B. S., '06	819 7th St., Box 854	BFX 908719	2S
Koehler, H., '04	E. L. & S. W. R. R.	RL 634200	5S
Martin, E., '06	Box 1021	RL 950018	2S
Polley, Lorna L., '05		BAX 812337	2S
Sexton, J., '99	Box 762	HS 17642	3S, 12P
Woodhams, T. O., '04	Box 915	HD 721071	19S, 8P
<b>Towns</b>			
Walker, J. H., '04	Dragoon, % Mauzoro Mining Co., COCHISE	NC 701318	7S
<b>Flagstaff, COCONINO</b>			
Alvord, A. S., '02	Box 84	DL 452778	4S, 13P
Bradley, W. L., '02		GD 485599	12S, 15P
Gray, G. S., '05		HD 831280	28S, 1P
Haffly, C. A., '01		CC 12640	2S
Jack, F. J., '02		DM 467928	4S, 12P
Kirke, R. B., '05		EP 753822	11S, 3P
McGuire, A. C., '04		HD 736367	9S
McKinney, C. H., '99		JB 208	3S
McKinney, C. H., '99		TP 417	8S, D
Wells, T. F., '04		GC 625301	6S, 9P
<b>Towns</b>			
Colton, A. T., '93	Florence, PINAL	F 131	6S
Lowry, A. R., '04	Florence, Box 22, PINAL	BM 698147	5S
Halle, W. A., '99	Fort Apache, NAVAJO	J 7812	8S, 16P, D
Palmer, J. C., '91	Fossil Creek, NAVAJO	CM 94	22S
McFall, C. V., '06	Gila Bend, Box 17, MARICOPA	EAA 374558	11S, 6P
Picone, F., '04	Gleeson, COCHISE	NI 732058	16S
Twinch, W., '04	Glendale, Box 12, MARICOPA	EQ 654883	4S
<b>Globe, GILA</b>			
Bandhauer, R. J., '07	Box 317	HJ 956085	6S
Brown, T. J., '05	Box 858	DZ 843602	5S, 2P
Burke, P. J., '96	11 Tamarack Mine	U 101	4S, 21P
Chadwick, F. H., '03		MF 501856	6S
Cowan, L. W., '03		DO 617604	3S, 11P
Dixon, J. H., '02		HH 432182	17S
Fleming, C. S., '03	Box 415	EP 567840	13S, D
Fleming, C. S., '05	Box 415	EAA 824914	6S
Gibson, G. W., '04		BA 740715	2S

<i>Name and Year</i>	<i>Address</i>	<i>C. L. &amp; No.</i>	<i>Record</i>
Haby, L. G., '04	Box 163	EF 735201	14S, 8P
Haley, Jr., J. J., '01	% J. P. Bush, G. V. & N. Ry.	T 3001	3S, 10P
Haven, J. P., '05		NC 793027	13S, 4P
Lewis, R. S., '06	% Warrior Copper Co.	NK 912397	9S
Luffkin, J. T., '01	Box 338	HM 44860	4S, 4P
McGregor, Myrtle, '02	Box 517	DB 486895	6S, 17P
Parker, F. B., '02		HE 485598	13S
Pruett, C., '06		IH 853646	15S
Rees, G. C., '06	% Shattucks & Desmond, Box 644	BEX 897974	3S
Shelby, C. F., '02	% Old Dominion Copper Mining and Smelting Co.	NI 452625	23S
Sigmon, L. M., '05	Box 773	EP 792281	7S
Smith, E. P., '03	Box 22	MN 542487	3S, D
Snyder, F., '98		MP 515	6S, D
Taylor, O. A., '05	Box 135	ER 829553	3S
Wright, G. H., '02		BE 406953	2S

## Towns

Johnson, R. O., '06	Goldroad, MOHAVE	BEX 876769	5S
Reed, G. A., '02	Grand View, COCONINO	NH 381228	6S, D
Emery, F. B., '04	Groom Creek, Home Run Mine, YAVAPAI	BA 626202	2S
Hauser, F., '01	Groom Creek, YAVAPAI	MM 3365	11S, 9P
Cossel, S., '04	Harrington, YAVAPAI	HD 656234	35S
Olney, G., '02	Harrington, YAVAPAI	BA 411149	4S
Lechens, B. O., '05	Helvetia, % Omega Copper Co., PINA	NC 815910	5S, 13P
Lee, E., '03	Hot Springs, Castle Creek, YAVAPAI	NC 531235	5S
Lewis, J. W., '06	Humboldt, Box 117, YAVAPAI	NC 870101	7S, 4P

## Jerome, YAVAPAI

Benjamin, F., '04	Box 223	HH 690923	15S
Breston, W., '01		AA 347926	6S, D
Brown, J. G., '02	Box 110	J 18407	6S
Crazl, Jr., S., '02	Box 512	HH 496820	16S, D
Fallon, Bessie, '03	Box 552	BEX 531237	6S
Fuller, W., '05		EQ 784245	5S
Glenn, G. M., '03		NH 549446	3S
Hopkins, D., '02	% Montana Hotel	DO 401648	3S, 16P
La Jennesse, F., '05		BE 742605	4S
Moss, A., '04	Box 55	NC 680592	9S, 17P
Pillsbury, I., '99		MM 1136	6S, 14P
Thomason, W., '01		SM 350306	5S
Wirtz, H. M., '06	% Montana Hotel	NC 893043	5S, 4P

## Towns

Johnson, Edith W., '02	Johnson, COCHISE	LA 433107	40P, D
Bagg, J. S., '01	Kingman, MOHAVE	MM 3285	6S
Finley, W. A., '06	Kirkland, YAVAPAI	LH 862076	10P
Hasselfeldt, L. J., '98	Kirkland, YAVAPAI	CC 541	6S
Johnson, J. R., '99	Kirkland, YAVAPAI	MP 637	6S
Martin, R. B., '00	Kofa, YUMA	MM 1796	14S, 11P
Stockwell, Jennie C., '02	Lehi, COCONINO	BA 424438	3S
Daume, C. C., '06	Lowell, Box 292, COCHISE	HE 921931	25S
Hermanns, C., '05	Lowell, General Delivery, COCHISE	HB 844184	14S, 4P, D
Quinliven, M. S., '06	Lowell, General Delivery, COCHISE	DN 853638	7S, 20P
Schaeffer, M. A., '02	Lowell, COCHISE	HH 597325	18S
Sessions, B., '02	Lowell via Bisbee, COCHISE	HH 488584	11S
Thrasher, C. C., '05	Lowell, COCHISE	RR 829327	7S
Winwood, C. T., '00	Lowell, COCHISE	C 36691	10S, 26P
Kegel, A., '03	Mayer, YAVAPAI	GC 587423	7S, 15P, D
Gironx, F. W., '95	Mayer, YAVAPAI	MM 92	7S
Pain, A., '02	Mammoth, PINAL	NC 415810	7S, 1P
Anderson, A. S., '02	McCabe, YAVAPAI	GC 373297	7S, 15P, D
Clement, W., '04	McCabe, YAVAPAI	NC 693380	7S, 5P
Massey, A. C., '98	McCabe, YAVAPAI	MM 104	12S
Cerny, F., '99	Mesa, MARICOPA	J 7512	4S, 4P
Reynolds, J. F., '05	Mesa, MARICOPA	HF 815986	15S
Brown, J. L., '02	Metcalf, % Shannon Copper Co., GRAHAM	NC 440492	5S

<i>Name and Year</i>	<i>Address</i>	<i>C. L. &amp; No.</i>	<i>Record</i>
Stevens, W. R., '06	Metcalf, GRAHAM	NC 870369	22S, 14P, D
Murphy, P., '03	Middleton, % Peck Mine, YAVAPAI	HE 601874	12S
Cowan, G. L., '99	Minnehaha, YAVAPAI	HS 21415	4S, 1P
Schneider, E., '93	Minnehaha, YAVAPAI	C 511	8S
Brubaker, E. H., '04	Morenci, Box 311, GRAHAM	DV 699641	15P, D
Knapp, G. Z., '06	Morenci, D. C. Mine Office, Box 312, GRAHAM	DZ 918976	4S, 15P
Knox, T., '99.	Morenci, Box 65, GRAHAM	MM 824	10S, 6P
McDougall, J. A., '02	Morenci, Box 556, GRAHAM	DO 474043	6S, 38P, D
Morrisson, J. D., '02	Morenci, Box 481, GRAHAM	AG 422984	7S, 10P
Ruernenapp, J., '04	Morenci, GRAHAM	ES 621267	9S
Schufeldt, C. L., '07	Morenci, 218 D St., GRAHAM	AC 997448	4S
Scoll, W. G., '02	Morenci, Box 254, GRAHAM	NC 401887	20S, 14P, D
Williams, W. O., '06	Morenci, GRAHAM	NK 898515	18S
Davis, W. L., '04	Mowry, SANTA CRUZ	BM 635155	5S
Sorenson, G. A., '96	Naco, % Carl Clansen Cananea Co., COCHISE	C 3087	9S, 25P
Castillo, C., '02	Nogales, SANTA CRUZ	MF 445849	7S
Eucinas, J. G., '06	Nogales, Box 287, SANTA CRUZ	MHX 923762	6S
Griswold, A. J., '96	Nogales, SANTA CRUZ	J 771	9S, 10P
Ogle, W. J., '05	Nogales, SANTA CRUZ	RV 749105	2S
Rodriguez, J. L., '02	Nogales, Box 185, SANTA CRUZ	BA 54578	2S
Clark, H., '02	Octave, YAVAPAI	NB 387507	6S, 13P
Russell, C., '02	Octave, YAVAPAI	NC 422418	23S, 17P, D
Mueller, H. C., '97	Paradise, COCHISE	F 798	13P
Waughtal, T., '00	Paradise, COCHISE	F 1532	7S, 14P
Gibson, W., '02	Pearce, COCHISE	EP 496385	8S
Smith, A., '99	Pearce, % Commonwealth Mining and Milling Co., COCHISE	MM 859	4S, 12P
Bartlett, W. H., '97	Peoria, MARICOPA	HS 3776	5S

## Phoenix, MARICOPA

Aldrich, J., '05	Box 282	BEX 751630	SS
Anderson, W. J., '04	S. F. P. & P. Freight Office	AD 639544	6S, 18P
Andrews, J. C., '01	R. F. D. 1	AB 2014	3S
Bates, A. L., '02	603 N. 1st St.	HH 494787	15S, D
Beckerdite, L. E., '05	546 N. 3d St.	HJ 796668	17S
Bellas, A. J., '01	Box 158	C 46885	11S, 5P
Craig, R. A., '05	R. F. D. 3	EAA 818611	22S
Dickerson, W. J., '06	R. F. D. 1	1H 861176	2S
Fanger, H., '00	R. F. D. 1	MD 12370	3S, 17P
Fanger, H., '03	R. F. D. 1	AC 533096	4S, 20P
Ford, E. E., '00	14 N. 2d St.	MM 1651	23S, 14P, D
Forehan, T. B., '02	338 S. 2d Ave.	AG 409776	11S, 19P
Ganz, S. C., '06	410 W. Monroe St.	BFX 930380	6S
Goodrich, J. B., '01	% M. & P. R. R. Co.	LR 9210	2S
Heileman, W. H., '05	357 N. 2d Ave.	AC 818610	21S, 1P
Hunt, F. W., '00	Box 874	X 10232	5S, D
Icke, R. J., '02	% Mr. James Harmon	NC 373052	23S, 14P, D
Irwin, Mary E., '02	523 N. 3d St.	BA 430937	3S
Jackson, E., '00	405 E. Madison St.	MP 1168	6S, D
Jones, H. E., '05	1111 W. Adams St.	GA 842699	29S, 24P
Lipsohn, I. J., '04	630 N. 2d St.	LA 632563	8P
Ludlam, J. P., '04	1019 1st Ave., S.	NC 707141	10S, 4P
Maasberg, C., '96		U 62	2S, 16P
McDonald, C. V., '04	202 N. 7th Ave.	EI 631354	8S, D
McIntosh, J., '06	421 E. Washington St.	HD 907367	16S
Morgan, Jr., J. H., '99	506 E. Adams St.	MD 5880	3S, 22P
Nelson, F. W., '02		DO 469317	6S, 38P, C
Offield, A. A., '05	710 S. 3d Ave.	HD 765534	20S
Schalalos, J. J. F., '02	Box G	DB 390479	2S, 11P
Severns, H. T., '02		NC 384796	4S, 11P
Shideler, J. R. B., '97		ME 2073	17S, 12P
Smith, J. D., '03	Box 26	HD 560429	28S
Story, W. A., '99	N. Center St., Room 9, Nicholson Bldg.	A 3300	11S, 13P
Taylor, F. A., '02	Box 236	HE 435131	27S
Tenfert, J. F., '04		NH 729179	6S, D
Vinson, W. R., '02	1315 E. Jefferson St.	EP 462106	10S
Wheeler, R., '06	715 W. Madison St.	EP 928043	8S
White, A. P., '98	Box 281	J 3586	4S, 1P

Name and Year	Address	C. L. & No.	Record
<b>Towns</b>			
Nattall, E., '04	Pinda, GRAHAM	HH 730641	6S
Goodfellow, D., '04	Pine, Box 1, GILA	HE 681772	24S, 7P
<b>Prescott, YAVAPAI</b>			
Alvord, H. J., '04		LA 689502	21P
Brown, J. S., '01	% Brown Bros.	MM 3213	9S, 11P
Bumpers, C. M., '04		EN 672919	5S
Coleman, J. J., '96	% A. J. Pickrell	F 522	5S
Frey, D. E., '05	126 N. Marina St.	DZ 838528	5S, 13P
Harbauer, G. J., '02	126 N. Alarcon St.	NC 418045	23S, 14P, D
Hubbell, G. M., '06	322 S. Granite St.	NH 880545	5S
Joy, H., '99	% Prescott Electric Co.	TP 1076	8S, D
Kendall, H. A., '02	148 S. Summit St.	AC 497347	4S, 3P
Law, M., '06		LH 871394	12 Parts
Lawrence, G., '98	Box 534	CC 333	2S
Love, A., '01	527 E. Sheldon St.	LR 9954	3S
Marshall, W. H., '06	204 Western Ave.	EQ 940462	8S
Nelson, J. L., '03	Box 622	NI 545962	24S, D
Parkins, G. W., '00		A 8223	2S, 19P
Ryan, Theresa E., '04	210 E. Willis St.	BA 695869	2S
Sayre, C. E., '97	% F. G. Whipple Barracks	T 115	29S, 24P
Stitzer, M. M., '99		C 20770	3S, 13P
Warren, G., '02	407 S. Montezuma St.	HE 490060	18S, 5S
Webster, E. E., '02	Box 451	HE 490817	33S, 13P
Weibel, S. A., '04	315 N. Mount Vernon St.	GC 682561	4S, 12P
Wood, H. R., '01	Box 201	F 1862	20S, 17P
<b>Towns</b>			
Clements, C. C., '02	Redrock, PINAL	HE 423465	27S, 6P
Cohea, W. M., '01	Roosevelt, GILA	X 20673	6S
Miller, J. M., '06	Roosevelt, GILA	BEX 855792	2S
Wilson, B. K., '07	Rosemont, PIMA	HH 951927	18S
Sage, F. L., '03	Rucker, via Pearce, COCHISE	EP 536102	10S, 5P
Gordon, T., '03	Sacaton, Dept. of the Interior, U. S. Indian Service, PINAL	EN 57936	11S, D
Haffziger, F., '05	Safford, GRAHAM	HH 750109	9S
Swift, T. T., '02	Safford, Box 7, GRAHAM	NA 477562	36S, 15P, D
Dana, H., '05	Saint David, COCHISE	AG 832502	4S, 19P
Bennett, W., '97	San Carlos, GILA	CC 196	2S
Johnson, G. T., '05	San Simon, COCHISE	HD 831871	41S, 15P
Campbell, J., '00	Seligman, YAVAPAI	C 38458	3S, 16P
Fisher, C. H., '99	Seligman, YAVAPAI	E 1391	9S, 4P
Kirkhuff, J. G., '02	Seligman, YAVAPAI	RR 478812	1S
Higgins, F. H., '01	Silverbell, PIMA	MP 1638	6S, D
Shaw, W. M., '02	Silverbell, PIMA	NC 493981	12S, 16P
Coughran, C., '04	Skull Valley, YAVAPAI	EN 727905	12S
Hofer, L., '01	Sonora, TUOLUMNE	NC 355176	22S, 16P
Martin, F. J. L., '04	Superior, PINAL	DX 701098	26P
Appleby, W., '02	Tempe, MARICOPA	HE 456594	7S
Berg, L., '05	Temple, % Bartlett Head Land Co., MARICOPA	HH 808799	18S
Clark, A. B., '06	Tempe, Box 1414, MARICOPA	AK 887146	7S, 9P
Gustafson, C. O., '01	Tempe, MARICOPA	HA 366571	9S, 18P, D
Miller, Jr., A. J., '01	Tempe, MARICOPA	X 14419	5S
Blackwell, E. G., '99	Tombstone, Box 491, COCHISE	HS 18197	3S, 1P
Hands, P. A., '02	Tombstone, COCHISE	NC 382260	20S, 5P
Herrmann, R. B., '05	Tombstone, Box 216, COCHISE	NC 799746	23S, 14P, D
Levitt, A., '93	Tombstone, COCHISE	C 628	17S, 25P, D
Levitt, A., '04	Tombstone, COCHISE	MO 681510	1S
Walker, E. W., '99	Tombstone, COCHISE	E 611	10S, 17P
Walker, M., '06	Tombstone, Box 484, COCHISE	NC 499133	18S, 10P
<b>Tucson, PIMA</b>			
Angus, W., '02	426 9th St.	EW 440468	13S, 5P
Beattie, D. S., '06	136 S. 4th Ave.	RR 889234	2S
Day, C. F., '05	273 N. Main St.	AK 845520	10S, 2P
Edelstein, K. J., '05	106 4th Ave.	NC 828259	9S, 5P



<i>Name and Year</i>	<i>Address</i>	<i>C. L. &amp; No.</i>	<i>Record</i>
Fairfax, J. A., '03		LA 513113	8P
Ferrin, A. H., '04	414 S. 3d Ave.	EG 737372	5S
Fisher, F. A., '04	% Ramona Hotel	RV 650845	6S
Giddes, R., '04	166 Scott St.	NC 718719	23S, 14P, D
Hepburn, H. M., '00	239 N. Church St.	C 30871	6S, 15P
Ingersoll, F., '02		HB 387433	5S
Jaastad, H. O., '03		AG 562305	9S, 19P
Levy, F., '02	Box 477	JA 403479	17S, D
Marks, H. W., '06	Box 728	NC 875700	8S, 14P
McKelvey, A. J., '02	Box 321	BE 477347	5S
Monthan, O., '02	Box 775	NA 412436	6S, 5P
Nolan, B., '04	246 S. 4th Ave.	EP 736867	7S, 5P
Olsen, W. A., '00	9th St.	LR 3420	2S
Paige, D. C., '97		MP 280	2S
Poorman, G. H., '02		EP 490824	10S, P
Quickel, A. F., '04	327 S. 4th Ave.	BK 635145	5S
Robinson, W. F., '98	Box 973	AD 456	2S, 25P
Stallard, C. J., '06	159 E. Pennington St.	AG 908709	5S
Tussing, W. E., '00	Box 684	AD 3533	3S, 11P
Woodard, E. G., '98	Box 562	A 2773	15S, 19P

**Towns**

Marrs, G. O., '04	Walker, YAVAPAI	LA 512801	21 Parts
Kempenich, E., '03	Whiteriver, NAVAJO	EF 551255	7S, 4P
Jennings, O., '04	Wickenburg, MARICOPA	NC 729567	20S, 14P
Michilsen, D. S., '01	Wickenburg, MARICOPA	MM 3190	6S, 2P
Nelson, R. L., '05	Wickenburg, % White Gold Mining Co., MARICOPA	NC 758910	9S, 4P
Dodge, J., '02	Williams, COCONINO	AG 460142	8S, 15P
Robinson, M., '06	Williams, COCONINO	LH 913076	8 Parts
Wilson, W. D., '02	Williams, Box 272, COCONINO	HE 451370	9S

**Winslow, NAVAJO**

Ball, R. H., '05	Box 122	EAA 808391	17S
Brown, O. A., '05		RL 846367	2S
Cozby, C. C., '03	% V. C. Proctor, Supt. C. T. & S. R. R.	HD 557607	6S
Gray, J. A., '01		LR 9390	2S
Hayman, C. R., '00	Box 29	LR 5632	3S
Hogg, V. F., '04		EH 735212	5S
Kirschman, E. M., '01		RH 327	6S, D
Lynn, F. M., '04		RL 731330	2S
McFarland, E., '05		HD 808705	15S
Phares, M. J., '01	Box 73	LR 9164	2S
Sanderson, S. B., '06		RR 881945	1S
Weeks, W. E., '01		LR 9904	3S

**Towns**

Norton, R., '98	Yuma, YUMA	HS 7275	10S, 17P, D
Murray, J. S., '04	Yuma, YUMA	LA 680339	20P
Smith, B. W., '03	Yuma, U. S. Geological Survey, YUMA	GC 558945	5S, 15P, D
Smith, W. D., '00	Yuma, Box 417, YUMA	I 942	12S, 7P
Sullivan, P. J., '03	Yuma, Box 461, YUMA	IB 580833	2S
Vaughn, J. A., '01	Yuma, % California Devel. Co., YUMA	CSF 164	10S, D
Wilkerson, W. F., '00	Yuma, YUMA	MP 911	2S
Williams, I., '03	Yuma, Box 468, YUMA	HF 64505	13S