Department of Agricultural Education
Virginia Polytechnic Institute
Blacksburg, Virginia

A STUDY OF METHODS EMPLOYED IN CONDUCTING CLASS WORK AND EXAMINATIONS

At The

VIRGINIA POLYTECHNIC INSTITUTE.

Major Thesis

Submitted for the degree of

Master of Science in Agricultural Education

By-

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A STUDY OF METHODS EMPLOYED IN CONDUCTING CLASS WORK AND EXAMINATIONS

At The

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Object: The Committee on Instruction in Agriculture, Home Economics and Mechanic Arts of the Association of Land-Grant Colleges has undertaken a study of the methods employed in conducting examinations in all Land-Grant Colleges, hoping thereby to get some suggestions which will be helpful to the colleges, especially in connection with their efforts to improve the teaching of agriculture, home economics and mechanic arts.

The writer was designated to make this study at the Virginia Polytechnic Institute, and has taken the liberty of extending the study to all departments of the institution offering class work, with the object of showing the actual methods used in each department and the variations, if any, between departments.

Procedure:

1. A general study of methods and means of measurement in higher education was made. This was done by using reliable books on the subject, bulletins, pamphlets and letters from various leaders in the field as sources of information. Among these were:

Measurement in Education, McCall.
Measurement in Higher Education, Wood.
The Improvement of the Written Examination, Rugh.
The Present Status of Written Examinations and Suggestions for Their Improvement, Monroe.
Examinations, Grades and Credits, Cattell.
Supervision of the Special Subjects, Greene.
Various bulletins, pamphlets and letters.

2. A questionnaire (see pages 3 and 4) was sent out to all heads of departments and numerous personal interviews were had in order to get the information selected.

3. The data thus obtained was tabulated in an effort to show:

   (a) Distribution of grades

   (b) Methods of giving tests and examinations

   (c) Methods of instruction

   (d) Methods of determining content of courses of study

4. Some of the above data was compared to data already compiled at other institutions.

The writer wishes to thank the heads of the various departments for their hearty cooperation, without which this study would have been impossible.

QUESTIONNAIRE

Outline of a study by each Land-Grant College of methods employed in conducting tests and examinations in college subjects.

I. (a) Name of Department_____

(b) Head of Department_____

(c) Tabulate in spaces below the distribution of grades for the entire department, i.e. the number of students in the department falling within each grade. These marks should include those given in 1923-24 but, in order to get a large number, any grades made in the department this year or in previous years may be used. Try to get 2000 grades as your distribution will be compared with other distribution curves made up of large numbers of marks -- only a fairly large number will show your distribution clearly and accurately.

	F	E	D	C	B	A
TOTALS						

II. Examinations.

1. Method of preparing examinations.
   (a) Each instructor working independently_____
   (b) Instructors having different sections of the same subject working in collaboration_____
2. Method of grading.
   (a) Independently - each instructor working independently_____
   (b) Instructors in collaboration or consultation to the extent of following the same procedure_____
   (c) Do instructors grade all of the questions of one paper, then all of the questions of another paper, or do they grade question one of all papers, then question two of all papers, and so on?
   _____
   (d) Do instructors grade solely with reference to fixed standards or do they adjust grades so as to approach a normal distribution?
   _____
   (e) In making up the term marks, what relative weights are given to class work, quizzes, preliminary examinations and final examinations?
   _____

III. Objective tests. -(See explanation enclosed)

1. Are they used, and to what extent?_____
2. Principal types used - true-false tests, recall or completion tests, multiple choice tests. (Underscore types used)
3. Report on advantages and limitations of each type. _____
   _____
   _____

IV. For which of the following purposes are tests used in each department or subject considered?

1. Diagnosis or placement. _____
2. Measurement of progress or attainment. _____
3. Measurement of the quality of teaching. _____
4. Measurement for vocational guidance. _____

V. Make any comments or suggestions regarding methods of conducting examinations which you think will be helpful in connection with this study.

VI. Assignment.

(1) Definite amount of work?
(2) When is assignment made?
(3) Based on text-book or other material?

VII. Class Procedure.

(1) Based on assignment?
(2) Types of lessons used-
(a) Lecture?_____; (b) Question & answer?_____
(c) Discussion?_____; (d) Drill?_____
(e) Inductive?_____; (f) Deductive?_____
(g) Examination?_____; (h) Appreciation?_____
(i) Review?_____; (j) Study lesson?_____
(k) Is the problem method used?_____

(3) Is there definite relationship between lecture work and laboratory work?

VIII. Course of Study.

(1) What factors have been taken into consideration in selecting subject matter?

(2) Do the life needs of the students command consideration in the selection of subject matter?

CONCLUSIONS

Note:- The numerals and letters refer to the heads and sub-heads on the questionnaire.

I. DISTRIBUTION OF GRADES:

Educators differ slightly as to what is a normal distribution of grades. For a five point system of grading the following distributions have been recommended:

7, 24, 38, 24, 7

7, 18, 50, 18, 7

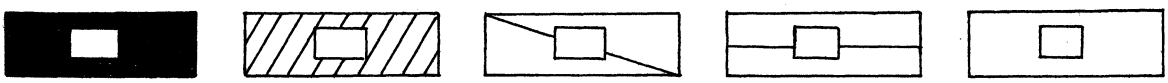
5, 15, 60, 15, 5

There are various others, but they differ very slightly from these. All distributions advocated by reliable authorities are alike in that they advocate that the large group be the C or average group and that the F and A groups be reserved for those who are very unsatisfactory or very highly satisfactory in their class work.

The writer will not attempt to enter into a controversy as to the advisability of grading to some standard distribution. University of Illinois Bulletin No.17, by Walter S.Monroe, Director, Bureau of Educational Research, has covered this subject very thoroughly and is easily available. The charts showing distributions of grades in this institution show a wide divergence of opinion as to the values to be placed on As, Bs, Cs and the like. No teacher should follow a standard distribution of grades blindly and irrespective of number in class, mentality of class and whether the class is composed of freshmen or seniors. These factors must be

considered. Perhaps the failure to distinguish between a score and a grade (University of Illinois Bulletin No.17 - pages 12-13) is one reason why grades do not approach a normal distribution. The fact remains, however, that an A in some departments does not represent the same grade of work as in some other departments. The graph for the institution as a whole tends to show a rather heavy distribution at either end and the largest group is the B group rather than the C group. Studies by Cattell, Monroe, Greene, and the more recent experiments conducted at Columbia University (Measurement in Education, Ben Wood) tend to show the desirability of having some distribution in mind and using it with common sense.

The writer has used a series of graphs to illustrate the distribution of grades in the various subjects. This graphical method is used by permission of L.S.Greene, State Supervisor of Industrial Education in Florida.

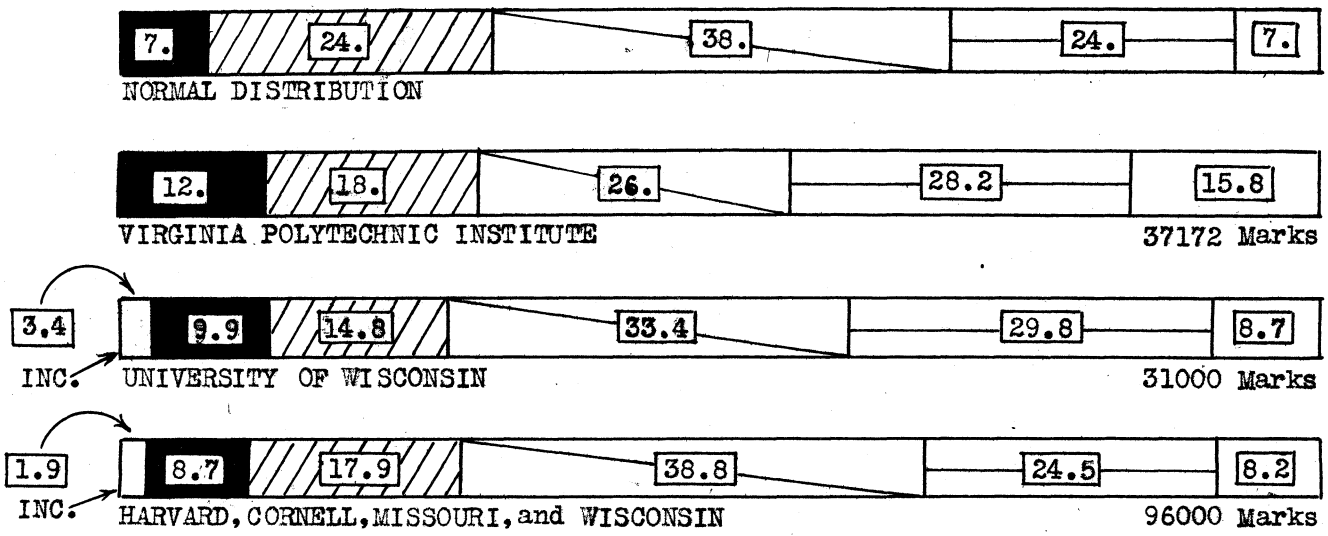


E & F D C B A

DISTRIBUTION OF GRADES

VIRGINIA POLYTECHNIC INSTITUTE

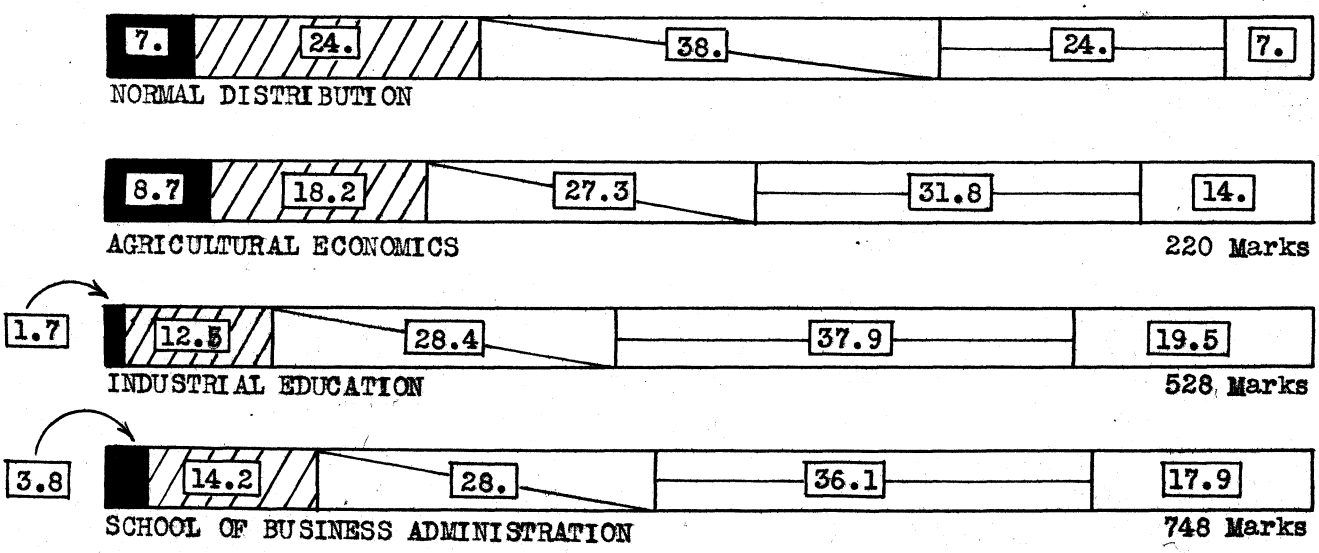
COMPARED WITH OTHER INSTITUTIONS



DISTRIBUTION OF GRADES

SCHOOL OF BUSINESS ADMINISTRATION

VIRGINIA POLYTECHNIC INSTITUTE

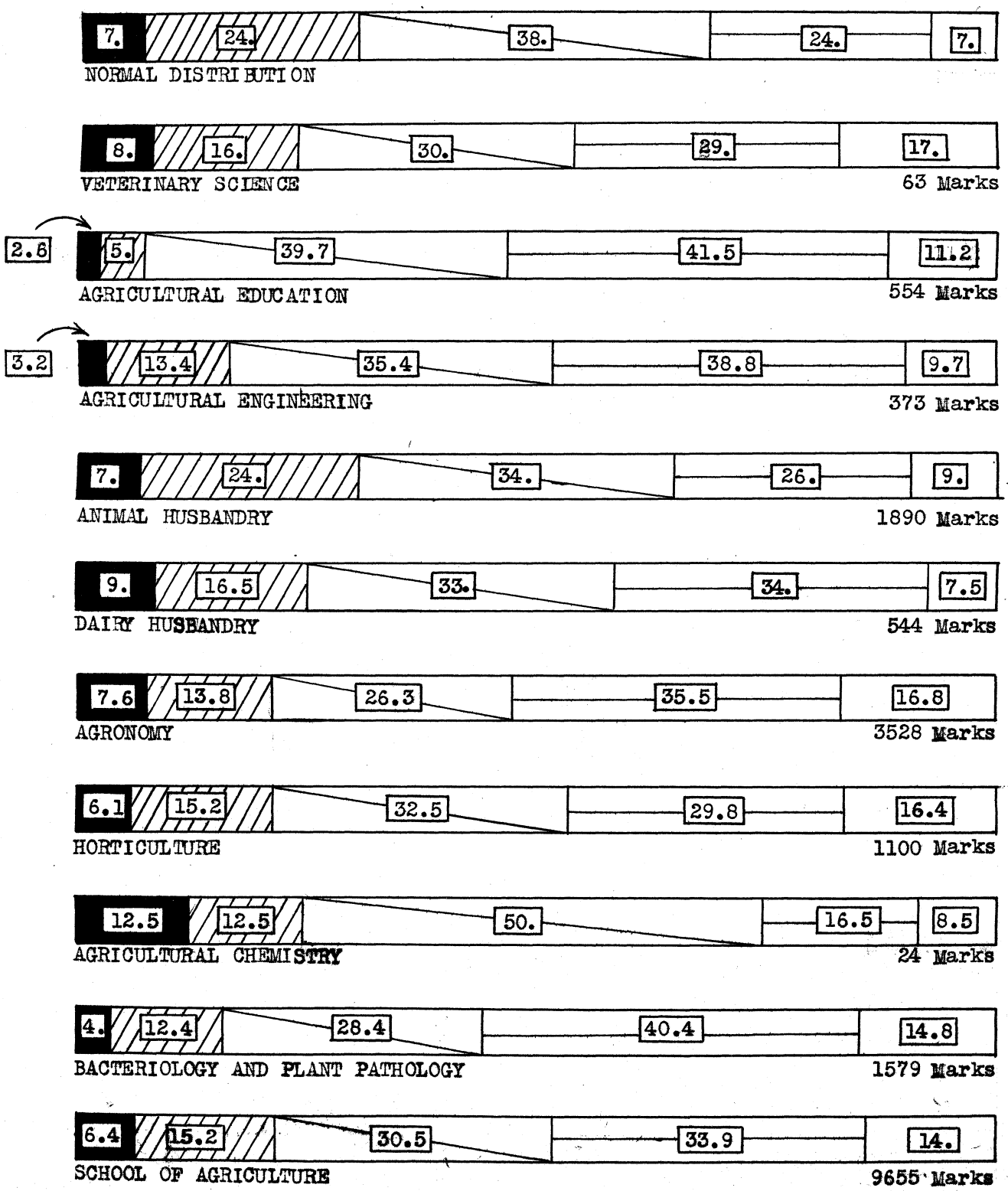


DISTRIBUTION OF GRADES

SCHOOL OF AGRICULTURE

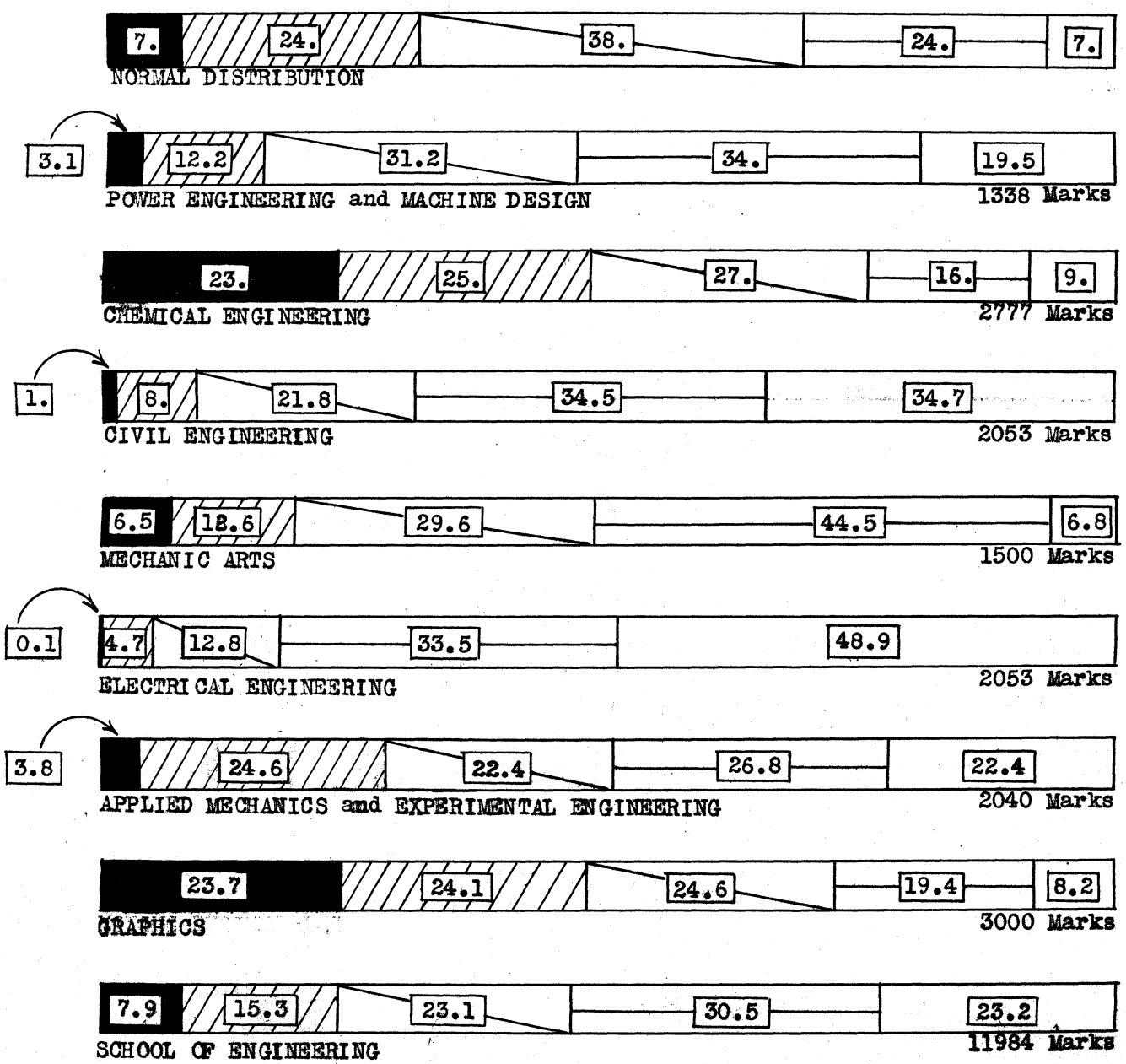
VIRGINIA POLYTECHNIC INSTITUTE

By Percentage



SCHOOL OF ENGINEERING
VIRGINIA POLYTECHNIC INSTITUTE

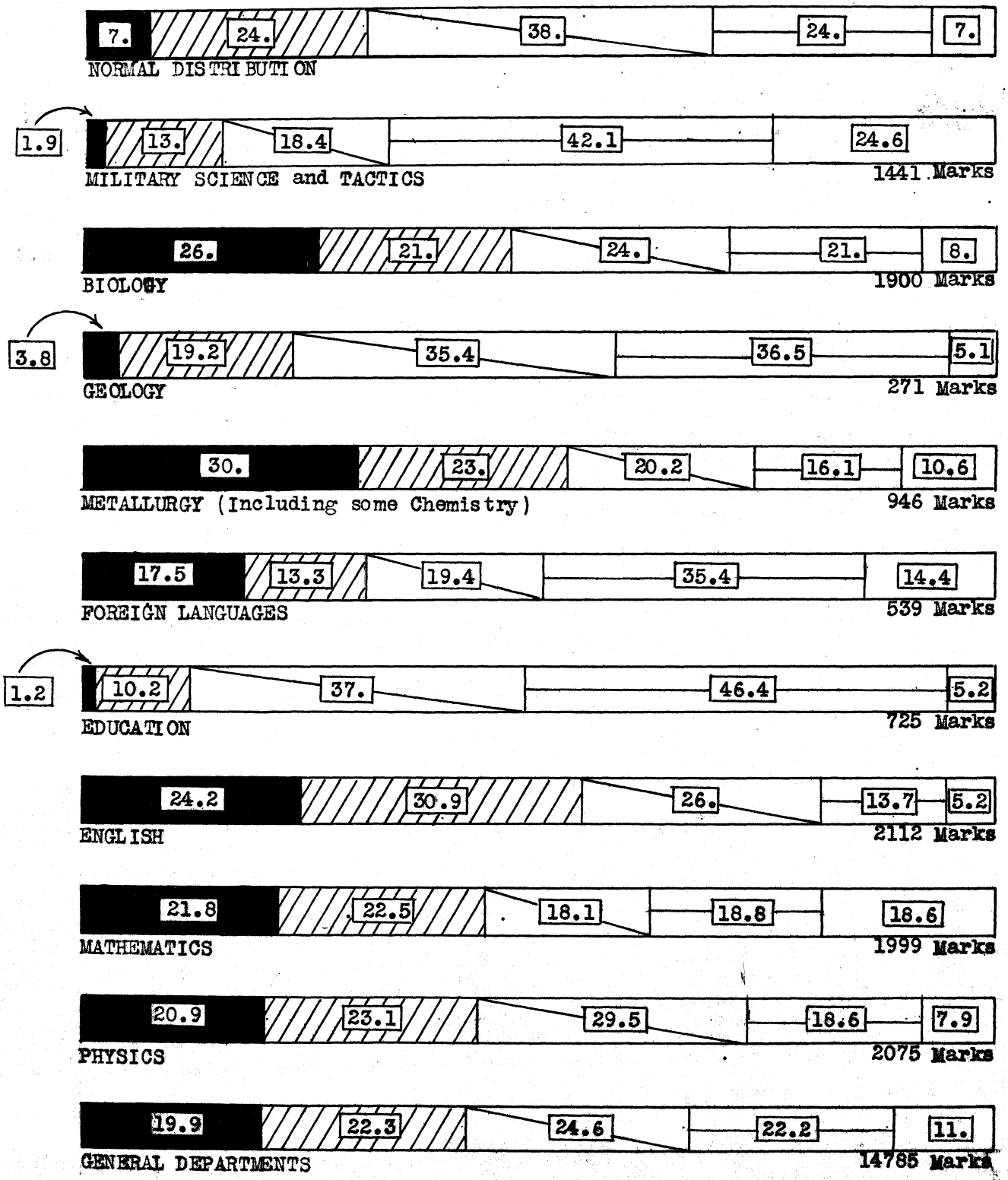
By Percentage



GENERAL DEPARTMENTS

VIRGINIA POLYTECHNIC INSTITUTE

By Percentage



DEPT.	E & F	D	C	B	A	TOTAL
SCHOOL OF AGRICULTURE						
Vet. Science	4	10	19	18	12	63
Agric. Education	15	27	220	230	62	554
Agric. Engineering	12	50	132	143	36	373
An. Husbandry	132	440	646	481	191	1890
Dairy Husbandry	49	90	180	183	42	544
Agronomy	268	488	929	1252	591	3528
Horticulture	67	167	357	328	181	1100
Agric. Chem.	3	3	12	4	2	24
Bact. and Path.	71	197	449	629	233	1579
NUMBER	621	1472	2944	3268	1350	9655
%	6.4%	15.2%	30.5%	33.9%	14%	
SCHOOL OF ENGINEERING						
Power Eng. & Mach.	42	164	417	454	261	1338
Chem. Eng. (See Chemistry)						
Civil Eng.	20	163	448	709	713	2053
Mechanic Arts	94	190	445	668	103	1500
Elec. Eng.	1	96	263	688	1005	2053
App. Mechanics	79	498	458	547	458	2040
Graphics	710	725	737	584	246	3000
NUMBER	946	1834	2768	3650	2786	11984
%	7.9%	15.3%	23.1%	30.5%	23.2%	
SCHOOL OF BUSINESS ADMINISTRATION						
Agric. Econ.	19	40	60	70	31	220
Ind. Educ.	9	66	150	200	103	528
NUMBER	28	106	210	270	134	748
%	3.8%	14.2%	28%	36.1%	17.9%	
GENERAL DEPARTMENTS						
Military	27	187	265	607	355	1441
Biology	498	402	449	395	156	1900
Chemistry	634	712	736	448	247	2777
Geology	10	52	96	99	14	271
Metallurgy	284	218	191	153	100	946
Foreign Languages	93	72	105	191	78	539
Education	8	74	268	337	38	725
English	507	653	550	291	111	2112
Math.	456	460	563	377	373	1999
Physics	433	481	612	385	164	2075
NUMBER	2930	3301	3635	3283	1636	14785
%	19.9%	22.3%	24.6%	22.2%	11%	
WHOLE INSTITUTION COMBINED						
NUMBER	4525	6713	9557	10471	5906	37172
%	12%	18%	26%	28.2%	15.8%	37172
NORMAN DISTRIBUTION	7	24	38	24	7	
Univ. of Wisconsin	9.9	14.8	35.4	29.8	8.7	31000
Harvard, Cornell, Missouri, Wisconsin	8.7	17.9	36.8	24.5	8.2	96000

II. E X A M I N A T I O N S

DEPARTMENTS	1. Method of preparing examinations		2. Method of grading				
	(a) Each instructor working independently?	(b) Instructors having different sections of the same subject working in collaboration?	(a) Each instructor working independently?	(b) Instructors working in collaboration or consultation following same procedure?	(c) Do instructors grade all questions of one paper before grading next paper or grade question one of all papers then question two, etc.?	(d) Grade to fixed standard or normal distribution?	(e) In making up the term marks what relative weights are given to class work, quisses, final examinations, etc.? *
SCHOOL OF AGRICULTURE							
VETERINARY SCIENCE	Only 1 instructor	No sections	1 instructor	Yes	Question one of all papers	Fixed standards	1/3 each
AGRICULTURAL EDUCATION	No	Yes	No	Yes	Both	Fixed standards	Teaching 40%; observation 10%; Supervised practice 10%; Exam. 20%
AGRICULTURAL ENGINEERING	Yes	Same instructor in all sections	Yes	Don't know	Both	Fixed standards	1/3 daily; 1/3 quizzes; 1/3 exams.
ANIMAL HUSBANDRY	No	Exams. same; tests different	No	Yes	All questions on one paper	Fixed standards	Class work 50% Exams. 50%
DAIRY HUSBANDRY	Yes	No sections	Yes	Yes	All questions on one paper	Fixed standards	Class work 50% Exam. 50%
AGRONOMY	Yes	No	No	Yes	All questions on one paper	Fixed standards	Class work 50% Exam. 50%
HORTICULTURE	Yes	No sections	Yes	No	Both	Fixed standards	Class work 50% Exam. 50%
AGRICULTURAL CHEMISTRY	Yes	No	No	Yes	All questions on one paper	Fixed standards	Class work 50% Exam. 50%
BACTERIOLOGY AND PLANT PATHOLOGY	Yes	No sections	Yes	No sections	Usually grade all of one paper	Some adjustment made	More weight to daily than to exam.
SCHOOL OF ENGINEERING							
CHEMICAL ENGINEERING	No	Yes	No	Yes	Each question scored by dif. inst'r.	Fixed standards	Class work 50% Exam. 50%
CIVIL ENGINEERING							
MECHANIC ARTS	Yes	No	No	Consult and follow same procedure	All questions on one paper	Fixed standards	Some classes, Daily 100% Others- Daily 50%; Exam. 50%
ELECTRICAL ENGINEERING	Yes	No	Yes	No	All questions on one paper	Fixed standards	Daily 50% Exam. 50%
APPLIED MECHANICS AND EXPERIMENTAL ENGINEERING	Yes	Conference held before working	Yes	Some conference	All questions on one paper	Fixed standards	Class work 40% Tests 60%
MINING ENGINEERING							
GRAPHICS	On some subjects	On some subjects	No	Yes	All questions on one paper	Fixed standards	
POWER ENGINEERING AND MACHINE DESIGN	No	Yes	No	Yes	All questions on one paper	Normal distribution	Class work 50% Exam. 50%
SCHOOL OF BUSINESS ADMINISTRATION							
AGRICULTURAL ECONOMICS	Yes 1 instructor	No	One instructor	Yes	All questions on one paper	Fixed standards	Exam. counts 25% to 50%
BUSINESS ADMINISTRATION	Yes	Yes	No	Yes	All questions on one paper	Fixed standards	Daily and quizzes 60% Exams. 40%
COMMERCIAL ENGINEERING	Yes	Yes	No	Yes	All questions on one paper	Both	Daily and quizzes 60% Exams. 40%
INDUSTRIAL EDUCATION	Yes	One instructor	Yes	Yes	All questions on one paper	Aim at normal distribution	Varies with classes
SECRETARIAL TRAINING	Yes	Yes	No	Yes	All questions on one paper	Both	Varies with classes
ECONOMICS AND HISTORY	No	Yes	No	Yes	All questions on one paper	Both	Class 1/3, quizzes 1/5; problem 1/5; exams. 2/5 for Econ. for History 50-50
GENERAL DEPARTMENTS							
MILITARY SCIENCE AND TACTICS	Yes	No	Yes	Yes	All questions on one paper	Fixed standards	No
BIOLOGY	No	Yes	Yes	Compare results	All questions on one paper	Fixed standards	Class work 50% Exams. 50%
CHEMINSTRY (See Chem.Eng.)							
GEOLOGY	Yes	No	No	Yes	Sometimes one way, sometimes another	Fixed standards	Daily tests 50% Examinations 50%
METALLURGY	One teacher	Yes	One teacher		All questions on one paper	Fixed standards	Exams. and tests 40-50% rest varies
FOREIGN LANGUAGES	No	Yes	Yes		All questions on one paper	Fixed standards	Class work 50% Exams. 50%
EDUCATION	One teacher	Yes	One teacher	Yes	All questions on one paper	Aim at normal distribution	Class work 1/3; tests 1/3; Exams. 1/3
ENGLISH	No	Yes	No	Yes	All questions on one paper	Fixed standards	Daily 50% Final Exam. 50%
MATHEMATICS	No	Yes	Largely	Yes	All questions on one paper	Adjusted when very abnormal	Class work 25%; tests 25%; Exams. 50%
PHYSICS	No	Yes	No	Yes	Question one on all papers	Adjusted when very abnormal	Class work 10%; Prelim. Exams. 40%; Final Exams. 50%
SUMMARY IN PERCENTAGES	Yes -- 66 2/3 % No -- 33 1/3 %	Yes -- 84 % No -- 50 %	Yes -- 50 % No -- 50 %	Yes -- 84 % No -- 7 % Don't know - 3 % Some conference - 6 %	Question one of all papers -- 10% All questions on one paper -- 77 % Both methods -- 13 %	Fixed standards - 75% Adjusted -- 17% Both -- 10%	Daily Grade -- 45% Tests -- 9% Exams. -- 46%

* A regulation giving daily grade 50% and examinations 50% is followed at V.P.I. in most cases. Neither can help the other over ten points.

II. EXAMINATIONS:

Summary:

1. (a) Examinations are prepared by teachers working independently in two-thirds of the departments. This includes those departments having only one teacher.

   (b) Eighty-four percent of the teachers having different sections of the same subject in large departments prepare examinations in collaboration.

2. (a) Fifty percent of the departments report that each teacher works independently in grading papers. This includes departments having only one teacher.

   (b) Eighty-four percent of the departments report consultation or collaboration to the extent that all teachers in the department follow the same procedure. This includes some departments having only one teacher, explaining the discrepancy in figures.

   (c) Ten percent of the departments grade question one of all papers then question two of all papers, etc.

   Seventy-seven percent report that they grade all questions on one paper then all questions on another paper, etc.

   Thirteen percent use both methods.

   (d) Departments grading to fixed standards ------- 73%
   Departments adjusting to a normal distribution, 17%
   Departments using both methods ---------- 10%

   (e) The average relative weights given to class work, tests and examinations is as follows:

   Class work (daily) -------- 45%
   Tests ---------- 9%
   Examinations ---------- 46%

   Most of the departments report class work 50%
   (including tests) and examinations 50%

DEPARTMENTS	III. OBJECTIVE TESTS			IV. PURPOSES FOR WHICH THESE ARE USED				V. COMMENTS AND SUGGESTIONS REGARDING METHOD OF CONDUCTING EXAMINATION — FURNISHED BY HEAD OF DEPARTMENT
	1. Are they used and to what extent?	2. Principal types used?	3. Advantages and limitations of each type?	1. Diagnosis or Placement?	2. Measurement of Progress Attainment?	3. Measurement of the quality of teaching	4. Measurement for Vocational Guidance	
SCHOOL OF AGRICULTURE								
VETERINARY SCIENCE	No			No	Yes	Yes	No	Student making grade of 80 or above has the privileges of retaking test immediately preceding.
AGRICULTURAL EDUCATION	Yes	All types.	Recall types most reliable.	Yes	Yes	Yes	No	
AGRICULTURAL ENGINEERING	Yes	Multiple choice	Testing easy, and so on catches up points not learned	No	Yes	Yes		Careful attention given class grade curve Individuals continuing downward are failed
ANIMAL HUSBANDRY	No			No	Yes	Yes	No	
DAIRY HUSBANDRY	Yes	Recall Multiple choice	Very advantageous in our work	Yes	Yes	Yes		Make first tests hardest to motivate study
AGRONOMY	No			No	Yes	No	No	
HORTICULTURE	No			No	Yes	No	No	
AGRICULTURAL CHEMISTRY	No			No	Yes	No	No	
BACTERIOLOGY AND PLANT PATHOLOGY	Yes	Recall Multiple choice		Yes	Yes	Yes	Yes	
SCHOOL OF ENGINEERING								
CHEMICAL ENGINEERING	No		Not suited to our work	No	Yes	No	No	
CIVIL ENGINEERING								
MECHANIC ARTS	No				Yes			
ELECTRICAL ENGINEERING	No			Yes	Yes	Yes	Yes	
APPLIED MECHANICS AND EXPERIMENTAL ENG.	No							
MINING ENGINEERING								
GRAPHICS	Yes			No	Yes	Yes	No	
POWER ENGINEERING AND MACHINE DESIGN	No				Yes	Yes		
SCHOOL OF BUSINESS ADMINISTRATION								
AGRICULTURAL ECONOMICS	Yes 50 %	True-False	Saves time - requires accurate information	No	Yes	No	No	
BUSINESS ADMINISTRATION	No							
COMMERCIAL ENGINEERING	No							
INDUSTRIAL EDUCATION	Yes	Completion True-False	Completion tests are most reliable	No	Yes	Yes	No	It seems well to use daily objective test to secure promptness, study and understanding of method of grading.
SECRETARIAL TRAINING	No							
ECONOMICS AND HISTORY	No							
GENERAL DEPARTMENTS								
MILITARY SCIENCE AND TACTICS	No			No	Yes	No	No	
BIOLOGY	Yes	Multiple choice	Not so well suited to our subjects	Yes	Yes			Objective tests not so fair in our subject where memory may be at fault; essay type seems fairer.
CHEMISTRY (See Chem. Eng.)								
GEOLOGY	No		Multiple choice tests give 50% credit to a student who knows nothing	No	Yes (Chiefly to stimulate study)			Objective tests may become a last resort of a lazy teacher. Neither essay nor objective tests are fair to all types of mind.
METALLURGY	Yes	Recall completion	True-false tests suggest mistakes, confuse student, encourage bluffing	Yes	Yes	No	No	
FOREIGN LANGUAGES	No			(Does not give tests)				
EDUCATION	Yes-almost entirely	True-false Multiple choice Situation-response	Good tests for attainment Tests for application	Yes	Yes	Yes	No	Do not set aside special days for examinations but use regularly scheduled class periods.
ENGLISH	No			No	Yes	No	No	
MATHEMATICS	No			No	Yes	Yes	No	
PHYSICS	Yes 20 %	Recall	Other types of objective tests invite guessing		Yes	Yes	Automatic	We consider problem solving best test of knowledge of Physics and ability to reason.
SUMMARY IN PERCENTAGES	Yes - 37% No - 63%	True-false—20 % Multiple choice — 30 % Recall — 25 % Completion — 15 % Situation response — 5 % Others — 5 %		No — 47% Yes — 25% Not answering - 30%	Yes — 60 % No — 0 Not answering — 20 %	Yes — 45 % No — 25 % No checks - 34 %	Yes — 10 % No — 50 % No checks — 40 %	

III. OBJECTIVE TESTS:

1. Departments not using objective tests ---------- 63%
   Departments using objective tests ---------- 37%

2. Principal types used:
   - True-false ---------- 20%
   - Multiple-choice ---- 30%
   - Recall ---------- 25%
   - Completion ---------- 15%
   - Situation-response--- 5%
   - Other types -------- 5%

3. Answers differ concerning the desirability of using objective test. Some departments report that they are not suited to the work. Others are using them to advantage. Very few departments are thoroughly familiar with the methods of making up, administering, scoring and grading objective tests. G.H.Ruch - "The Improvement of the Written Examination", a book published by Scott, Foresman and Company, is recommended as the best treatment of this method of examining.

IV. PURPOSES FOR WHICH OBJECTIVE TESTS ARE USED:

Departments using objective tests report as follows:

1. Used for diagnosis or placement ---------- 23%
2. Used to measure progress or attainment ------- 80%
3. Used to measure quality of teaching ---------- 43%
4. Used to measure for vocational guidance ------ 10%

V. COMMENTS AND SUGGESTIONS BY HEADS OF DEPARTMENTS:

Eight department heads made the following comments and suggestions regarding methods of conducting examinations:

1. Student making grade of 80 or above has the privilege of retaking test immediately preceding.
2. Careful attention given class grade curve individuals continuing downward are failed.
3. Make first tests hardest to motivate study.
4. It seems well to use daily objective test to secure promptness, study and understanding of method of grading.
5. Objective tests not so fair in our subject where memory may be at fault; essay type seems fairer.
6. Objective tests may become a last resort of a lazy teacher; neither essay nor objective tests are fair to all types of mind.
7. Do not set aside special days for examinations but use regularly scheduled class periods.
8. We consider problem solving best test of knowledge of physics and ability to reason.

DEPARTMENTS	VI. ASSIGNMENTS: 1. Def. amt. of work	2. When is assignment made?	3. Based on text-book or other material	VII. CLASS PROCEDURE: 1. Based on assignment?	2. Types of lessons used?	3. Def. relation-ship — class wk. & lab. wk.	VIII. COURSE OF STUDY: Factors considered in selecting subject matter?
SCHOOL OF AGRICULTURE							
VETERINARY SCIENCE	Yes	End of period. Large prob. far in advance.	Both	Yes	Lecture, discussion, problem, inductive, review, ques. & ans., appreciation.	Yes	Frequency of use, time, previous training of students. Life needs of students.
AGRI. EDUCATION	Yes	Daily at end of period. Some far in advance.	Plent. mat; No text	Yes	Group discussion, demonstration, problem method, job plan.	Yes 1*	1. Amt. of time spent in various activities by agri. teachers in state. 2. Policies laid down by St. Bd. Ed. 3. Needs of stud. as determined by needs of the state.
AGRI. ENGINEERING	Yes	Printed list for 1 class--others at beg. of period.	Both--5 no text	Yes	Lecture, discussion, review, ques. & ans., drill, problem method.	Yes	Material adapted to general use with particular regard to Va. conditions. Lack of time cuts course to the fundamentals.
ANIMAL HUSBANDRY	Yes	End of period.	Both	---	Lecture, discussion, review, drill, appreciation.	Yes	Time; pecularities of the state; source of students taking courses. Life needs of students.
DAIRY HUSBANDRY	Yes	Each day	Both	---	Lecture 25%; Discussion 25%; Review 25%; Ques. and Ans. 25%	Yes	Fundamental principles. Vocational needs.
AGRONOMY	Yes	After each period.	Both	Yes	Lecture. Deductive	Yes	- - - - -
HORTICULTURE	Yes	At regular intervals during year.	Yes	---	Lecture, discussion, ques. and ans., problem.	Yes	Time factor forces emphasis on fundamental principles of the subject.
AGRI. CHEMISTRY	Yes	Beginning or end of period.	Library facil.	---	Lecture, discussion, question and answer, deductive.	No. lab. work	Previous knowledge of students in agriculture and chemistry.
BACT. and PLANT PATHOLOGY	Yes	Time to time.	Both	---	Lecture, review, discussion.	Correlated.	Previous preparation of student. Life needs of students Essentials for gen. knowledge. Practical application.
SCHOOL OF ENGINEERING							
CHEM. ENGINEERING	Yes	At least one lesson in advance.	Prim. on text-bk.	Yes-inc. review	Varies with assignment and type of class.	2* Yes	Subject matter for fundamental chemistry courses is rather well standardized. Life needs of students command consideration with more advanced classes.
CIVIL ENGINEERING	---	---	---	---	---	---	- - - - -
MECHANIC ARTS	Usually	At end of class period.	Notes & text-bk.	---	Lecture, discussion, inductive, review, problem.	Yes	Time allotted; students' preparation; requirements of needs of school for which course is given; life needs of students.
ELECTRICAL ENGINEERING	Yes	Beginning or end of class period.	Both	Yes	Discussion, review, question & answer, drill study lesson, problem.	Yes	What the student knows; what he should know; best means of correlating the two. Life needs of students.
APPLIED MECHANICS	Yes	At beginning of quarter for context.	Both	Yes	Lecture, discussion, drill, problem.	Related, not record.	Practically the standard Mechanical Engineering curriculum.
MINING ENGINEERING	---	---	---	---	---	---	- - - - -
GRAPHICS	Yes	At beginning of term for some subjects.	Both	Yes	Problem method, lecture, discussion, review, ques. & ans., drill, deductive.	We think so.	1. Prep. of students; 2. Time devoted to subject; 3. Disciplinary & educative value of subj. matter; 4. Utilitarian value of subject matter; 5. Interest of subject matter; 6. Physical equipment of dept.; 7. Training of its personnel.
POWER ENG. and MACHINE DESIGN	Yes	All assignments given first time class meets.	Both	Yes	Lecture, discussion, review, deduction, appreciation, problem.	Yes	The specific needs of the course and related matter.
SCHOOL OF BUSINESS ADMINISTRATION							
AGRI. ECONOMICS & BUSINESS ADMINISTRATION	Yes	Beginning of class hour.	Both	Yes	Lecture, discussion, inductive, question & answer, problem method, study lesson; Lecture, discussion; also problem method.	Yes	1. Life needs of students. 2. Fundamental economic principles. 3. Facts pertaining particularly to Va. 4. Subj. matter presented by leading men in each particular field. Life needs of students.
COMMERCIAL ENGINEERING	Yes	Daily	Both	Yes	Lecture, discussion.	Yes	Life needs of students.
INDUSTRIAL EDUCATION	Yes 3*	Beginning of period.	Both	Yes	Discussion, inductive, deductive, review, drill, problem.	---	The most recent practical thought on the subject available. Life needs of students.
SECRETARIAL TRAINING	Yes	Daily	Yes	Yes	Lecture, discussion.	Yes	Life needs of students.
ECONOMICS and HISTORY	Yes	In each class.	Yes	Text-book	Discussion, question and answer.	Yes	1. Practical value. 2. Value for citizenship.
GENERAL DEPARTMENTS							
MILITARY SCIENCE AND TACTICS	No	-----	Not allowed to give assignment for outside study	---	Lecture, discussion, review, drill, question and answer.	4*	Subject matter prescribed by War Department.
BIOLOGY	Yes	At prior meeting.	Both	To some extent	Discussion, demonstration, lectures.	Absolutely.	Life needs of students. Coordination with other courses involving knowl. of subj. matter in courses we offer.
CHEMISTRY	(See Chemical Engineering)						
GEOLOGY	Depends on subj.	Various times.	Text-bk. when avail.	commonly.	Lecture, discussion, inductive, drill, review.	Yes	Too many to enumerate; availability of material, time allotment, purpose of course, ability of students, plan of teaching, inspiration. Life needs.
METALLURGY	Depends on progress	At end of each period.	Both	Yes	Lecture, discussion, question & answer, problem.	Yes	The estab. of fundamental prins; clarity of expression in books, etc. Practical importance in vocation; inspirational value.
FOREIGN LANGUAGES	Yes	Each day.	Text-book.	Yes	Lecture, review, question and answer.	---	- - - - -
EDUCATION	Yes	Each day.	Both	Yes	All types but lecture.	---	- - - - -
ENGLISH	Yes	At previous meeting of class.	Yes	Yes	All types used.	5* Yes	Students need past experience here, practices of other institutions.
MATHEMATICS	Yes	Beginning class period.	Both	Yes	Lecture, discussion, review, problem, ques. & ans., deductive, study lesson.	No	Training and development of students intellectual powers. Preparation of a basis for study of engineering. Life needs stressed.
PHYSICS	Yes Printed outline of course:	As much as a week in advance.	6* yes	Daily written quiz. 10 min.	Lecture, discussion, inductive, deductive, review, 180 problems.	Yes—50 min. lect. on theory involved bef. lab. exp.	1. Need of habits of scientific thinking. 2. Necessity of knowledge of physical principles underlying future technical work. 3. Life needs of students.

NOTE:-

1* -- Student required to carry out principles taught under supervision.
2* -- Yes in subject matter. Circumstances do not permit lab. work to run parallel with class work.
3* -- Usually by page of text-book.
4* -- Lectures bear definite relation to practical drill and field exercises.
5* -- Themes based on lecture work.
6* -- Printed outline gives assignments for topics.

VI. ASSIGNMENTS:

1. Practically every member of the faculty assigns a definite amount of work either at the beginning of the term or from day to day. Some assign pages in a text book, others assign a topic regardless of pages. Problems are assigned in the technical branches.

2. Answers to the question "When is assignment made?" were not very definite in many cases. Some teachers, however, reported that the assignment was made at the beginning of the period, some at the end, and a few reports stated that assignments are posted at the beginning of the term. An example of the latter method of making assignments is shown on page 15.

3. The assignments are nearly always based on a text book and other material as well.

VII. CLASS PROCEDURE:

1. The class procedure is practically always based on an assignment made previously.

2. The lecture and discussion types of lessons are most commonly used. The problem method is used somewhat as are the inductive, drill, deductive, question and answer, review, and appreciation types. Demonstrations are mentioned by a few departments.

3. Practically all departments report a definite relationship between class work and laboratory work.

VIII. COURSES OF STUDY:

Various factors are given as those considered in choosing subject matter. It is impossible to tabulate this material and the reader is referred to the large folded sheet, page 16. The life needs of the students are considered in fifteen departments as should be the case in an institution such as ours.

RECOMMENDATIONS:

1. That heads of departments give careful study to the matter of distribution of grades. Perhaps a standard distribution could be worked out for the institution by a committee. Monroe says that grades assigned in different schools or departments can have a common meaning only when they conform to the same standard distribution.

2. That very careful study be given to methods of preparing examinations so that their reliability as instruments of measurement may be increased.

   References:

   Wood, Ben D. -"Measurement in Higher Education", World Book Co.

   Ruch, G.M. --"The Improvement of the Written Examination", Scott Foresman Co.

3. That the distinction between scores and grades be recognized by teachers when assigning marks. This alone will make for wider distribution of grades.

   References:

   Monroe, W.S. -"The Present Status of Written Examinations and Suggestions for their Improvement".

4. That more frequent tests be given in some departments and that some of these tests be in objective form, carefully worked out and adapted to the subject matter.

5. That the value of final examination be lowered from 50% to 30%, and more weight be given tests and daily grades in order to motivate the study of daily assignments by students.

6. That some educator or teacher-trainer of known ability be procured for a series of lectures on class room methods before the faculty of Virginia Polytechnic Institute. Perhaps these could be arranged for the week before the fall term begins.