

13-8-15

27/6/29 III

31 12/98 SF/RH

10416/RH

Government of Madras

LAW (EDUCATION) DEPARTMENT

G.O. No. 1018, 11th July 1921

College of Engineering, Madras

Revised syllabus for the new Subordinate class—Approved.

INDEXED

ORIGINAL

Government of Madras

LAW (EDUCATION) DEPARTMENT

G.O. No. 1018, 11th July 1921

College of Engineering, Madras

Revised syllabus for the new Subordinate class—Approved.

READ—the following paper :—

Letter—from R. G. GRIEVE, Esq., M.A., F.R.G.S., M.L.C., Acting Director of Public Instruction.

To—the Secretary to Government, Home (Education) Department.

Dated—Madras, the 27th March 1921.

No.—5114/20.

In continuation of my letter Ref. on Cur. No. 5114, dated 12th March 1921, I have the honour to submit for the approval of Government a revised syllabus for the new subordinate class together with a copy of letter of the Principal, College of Engineering, Guindy, Ref. on Cur. No. 340, dated 23rd March 1921.

ENCLOSURE

BRANCH I.

SUBORDINATE CLASS.

Mathematics.

Arithmetic.—Labour saving methods in computation. Use of decimals in preference to vulgar fractions for practical calculations. Contracted multiplication and division. Evaluation of simple surd forms. Limits of error. Use of logarithmic tables. Graphical solution of simple arithmetical problems.

Mensuration.—Area and perimeter of plane rectilinear figures. Area of an ellipse, a circle, a sector, and a segment of a circle. Circumference of a circle. Length of an arc of a circle. Areas and perimeters of similar figures. Area of an irregular plane figure by mid-ordinate rule and Simpson's rule. Surface and volume of prism, cylinder, pyramid, cone, sphere, ring. Surface and volume of frusta of prisms, pyramids, cones and of sectors and segments of spheres. Volume of prismoids. Surfaces and volumes of similar solids. Volume of an irregular solid by Simpson's rule and by plotting ordinates representing areas of cross sections. Volumes of solids by weight of displacement. Estimation of areas, volumes, and surfaces from actual measurements of objects.

Plane Trigonometry.—Measurement of angles in degrees and radians. Definitions of the trigonometrical ratios of an angle and graphical determination of their values. Setting out angles from values of sine, cosine, etc. Relations between trigonometrical ratios of complementary and supplementary angles. Graphs of trigonometrical ratios. Functions of compound angles. Easy identities and equations. Graphical solution of equations. Relations between the sides and angles of a triangle. Use of tables of natural sines, cosines, etc., and of logarithmic sines, cosines, etc. Solution of triangles. Applications to heights and distances, etc. Lengths of the radii of the circumscribed, inscribed and escribed circles of a triangle in terms of the sides. Areas of regular polygons. Areas of a sector and segment of a circle.

Algebra.—Factorisation. Simplification. Rules of indices. Easy problems leading to simple and quadratic equations. Determination of constants in equations of known form such as $y = mx + n$, $y = ax^2 + bx + c$. Arithmetical Progression. Geometrical Progression.

Graphs of simple functions such as $y = mx + n$, $y = ax^2 + bx + c$, $y = \frac{a^2}{x}$, $y = (x-a)(x-b)(x-c)$. Graphical solution of equations and problems, and graphical determination of maximum and minimum values. Plotting observations. Probable intermediate values.

Geometry.—The inscribed, escribed and circumscribed circles of a triangle. To describe the following regular polygons (1) on a given base, (2) in a given circle, (3) about a given circle :—(a) square, octagon, (b) equilateral triangles, hexagon, (c) pentagon, decagon. The inscribed and circumscribed circles of regular polygons.

Proportional division of straight lines. To find a third proportional to two given straight lines. To find a fourth proportional to three given straight lines. To find a mean proportional to two given straight lines. To describe a triangle equiangular to a given triangle (1) on a given base, (2) in a given circle and (3) about a given circle.

Proofs of the following Theorems.—If a straight line is drawn parallel to one side of the triangle it divides the other two sides proportionally; and the converse. If two triangles are equiangular, their corresponding sides are proportional; and the converse. If two triangles have one angle of the one equal to one angle of the other and the sides about these angles proportional, the triangles are similar.

The areas of similar triangles are proportional to the squares on corresponding sides. The internal bisector of an angle of a triangle divides the opposite side in the ratio of the sides containing the angle, and likewise the external bisector externally.

If the vertical angle of a triangle be bisected by a straight line which cuts the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the segments of the base together with the square on the straight line which bisects the angle.

If from the vertical angle of a triangle a straight line is drawn perpendicular to the base the rectangle contained by the sides of the triangle is equal to the rectangle contained by the perpendicular and the diameter of the circum circle.

BRANCH II.

ENGINEERING.

1. Drawing.

(1) *Free-hand* and (2) *Model Drawing*.—Ornamental outlines. Application of elementary perspective to model drawing of simple objects.

(3) *Geometrical Drawing*.—(a) *Practical Plane Geometry*.—Elementary problems dealing with lines, triangles, quadrilaterals, circles; polygons; Methods of construction and problems relating thereto. Tangents; Inscribed and Described figures; Proportional lines and angles; Areas of plane Figures. Plane Curves; Parabola, Ellipse and Hyperbola; Methods of drawing and chief properties. Cycloidal, spiral and other common curves.

(b) *Practical Solid Geometry and Projection*.—Lines, points, and simple problems on planes. Projection of simple solids; The regular solids; Sections of solids; Development of plane and curved surfaces. Simple problems on Interpenetration of solids; Isometric Projection; Elements of Perspective.

Machine Drawing.—Ability to copy accurately to scale and supply additional views; Drawings of simple machine parts from sketches; Ability to supply some idea of the proportions of the more simple machine details such as bolts, nuts, keys, cotters, etc.

Building Drawing.—See note to syllabuses on Construction and Hydraulic Engineering.

[NOTE.—*Machine Drawing, Building Drawing and Hydraulic Engineering Drawing and Estimating*.—Special teaching in these subjects will be given during the courses of lectures in which Mechanical Engineering, Construction and Hydraulic Engineering are respectively taught. Marks will be allotted by the College for the drawing work done by students during these courses. A paper will also be set in each of the above three branches of drawing.]

2. Applied Mechanics.

(1) Mechanical Properties of Engineering Materials; Stress and Strain; Modulus of Elasticity; Elastic Limit; Ultimate Strength; Factor of Safety and Working Stress.

(2) Statics and applications to structures; Coplanar Forces; Parallelogram, Triangle and Polygon of Forces; Applications by graphical methods to simple frames with Pin joints, such as Cranes, etc. Wind pressure on roofs.

(3) Elementary Study of Beams; Bending Moment and Shearing Force; Sections of iron, steel and wood.

(4) Struts and columns; formulæ of Gordon and Euler.

(5) Simple Shear and Torsion; Strength of Shafts.

(6) Elementary application of theory in design of small bridges and arches generally, retaining walls and dams.

(7) Principle of work; potential and kinetic energy; Centrifugal force.

3. Construction.

Materials.

(1) *Stone*.—Varieties met with in Southern India. Quarrying. Blasting with powder and dynamite. Dressing. Average strength and weight of stone.

(2) *Bricks and Tiles*.—Brick earth. Tempering. Hand and machine moulding. Drying. Burning in clamps and kilns. Hoffman's kiln. Coloured bricks and tiles. Pressed bricks. Roofing, flooring and drain tiles. Fire bricks. Average strength and weight of brick. Characteristics of good bricks and tiles.

(3) *Line, Cement, Mortar, Concrete, Plaster*.—Sources and properties of lime. Burning in intermittent and running kilns. Slaking. Mortar mixing. Fat and Hydraulic limes. Portland cement manufactured in England and in Madras. Hydraulic mortar. Surki. Concrete. Practical tests for limes and cements. Strength of mortars and concretes. Plaster and plastering. Pointing. White and colour washing.

(4) *Timber*.—Growth. Felling. Seasoning, natural and artificial. Conversion. Preservation of timber. Varieties of timber used in Southern India—teak, sal, erool, karimaridoo, padowke, vengay, benteak, aynee, red and white cedar, rose-wood, casuarina, mango, palmyra, coconut, bamboo. Strength and weight of timber. Characteristics of good timber.

(5) *Metals*.—Iron Ores. Smelting. Grey and white pig iron. Castings. Pipes and columns of cast-iron. Chilled castings. Strength of cast-iron. Brief description of the manufacture of wrought-iron. Forms of wrought-iron. Galvanized and corrugated iron. Tests and strength of wrought-iron. Rivets and bolts. Punching and drilling holes. Rivetting. Cutting plates and bars. Welding. Steel, hard and mild. The Bessemer process. Strength of steel. Copper. Zinc. Lead. Tin. Alloys. Soldering metals.

(6) *Paints and Varnishes*.—Ingredients of paint. Litharge. Turpentine. Linseed oil. Mixing paint. Painting old and new work. Wood oil. Coal tar. Distemper. Varnish. Papering. Putty. Glazing.

Design.

(1) *Masonry*.—Coursed and uncoursed rubble. Block in course. Ashlar. String courses. Copings. Bricklaying. English and Flemish bonds. Bond at angles of walls, in footings with offsets, between main and cross walls, at door and window opening and in circular pillars. Foundations and footings. Plinth. Damp proof course. Thickness of main and cross walls. Wall plates. Wood bricks and plugs. Openings for timber beams, for doors and windows. Corbelling. Flat, segmental, pointed and relieving brick arches. Inverts. Centres for small arches. Bond in brick and stone arches. Small oblique arches. Enclosure walls. Buttresses and counterforts. Retaining and breast walls. Scaffolding.

(2) *Foundations*.—Excavation. Masonry and concrete foundations. Unequal settlement. Pressure on soil under foundations. Foundations in rock, good and bad soils. Piles. Cofferdams and caissons. Well foundations. Brick and iron wells. Mode of sinking wells. Patent excavators for well sinking. Setting out buildings from working plans.

(3) *Carpentry*.—Mortice and tenon joint. Fishing and scarfing. Iron straps and bolts. Roof and bridge frames, nature of stress in the different members. Details of joints. Frames of timber and iron combined. Trussed beams. Timber floors. Stairs, designing and setting out. Doors and windows. Centerings for arches. Striking centres.

(4) *Roofs and Floors*.—Terrace-roofs and floors on joists, beams and joists, or iron girders and joists. Bengal terrace roofs. Fire-proof floors. Brick arched roofs. Pitched roofs. Couples. Trusses. Rafters, purlins and reapers. Roof coverings of thatch, tiles, slates and shingles. Ceilings. Floors of stone, brick, tiles, concrete, timber and asphalt. Simple forms of iron roof. Use of tee, angle and channel iron in compression, and of rods and flat bars in tension. Joints and connexions. Shoes rivets, bolts. Iron and timber purlins. Brackets. Patent tiles, corrugated iron, lead and zinc roofing. Modes of attachment. Ventilators.

(5) *Bridges*.—Names of parts. Thickness of arch-ring, wing-walls, centerings. Setting out arches full size.

(6) *Roads*.—Road construction and maintenance.

(7) *Reinforced concrete*.—Simple designs, lintels, slabs, T. beams, columns and simple foundations.

[NOTE.—The above syllabus connotes Building drawing exercises, designs, and estimating.]

4. Hydraulic Engineering.

(1) *Hydrostatics*.—Hydrostatic laws. Pressure at a point and on a surface. Equal transmission of pressure. Atmospheric pressure. Syphon. Specific gravity. Flotation.

(2) *Discharge from Orifices and Notches*.—Small orifices. Velocity of discharge. Co-efficients of velocity, contraction and discharge. Rectangular orifice and notch. Triangular notch. Velocity of approach. Submerged and partly submerged orifices. Submerged notch.

(3) *Practical Cases*.—Tank weirs. Drowned weirs. Gauging weirs. Anicuts. Sluices: head, under, lock and tank. Modules.

(4) *Discharge under Variable Head*.—Free discharge from prismatic vessels. Time of emptying or filling locks. Discharge from one prismatic vessel into another.

(5) *Flow in Pipes*.—Fluid friction. Velocity in pipes. Virtual slope. Discharge. Inclination of pipes. Pipes not running full.

(6) *Flow in channels*.—Sections for channels. Co-efficients. Discharge of channels. Practical data. Channels of minimum border. Falls.

(7) *Rivers*.—Cross sections. Measurement of velocity and discharge. Flood discharge from catchment basins. Bends. Regime of rivers.

(8) *Storage and Distribution*.—Irrigation, navigation and town supply. Rainfall. Supply from wells, rivers and reservoirs.

(9) *Masonry Works in Irrigation Projects*.

(10) *Canals and Channels*.—Irrigation in deltas and elsewhere. Supply from rivers. Storage in tanks. Capacity of channel. Limiting velocity. Surface fall. Side slopes. Alignment. Cross drainage. Navigation canals.

(11) *Tanks*.—Isolated rain-fed tanks. Tanks in groups. Tanks supplied from rivers or streams. Catchment and capacity of a tank. Irrigating duty of water. Tank bunds, puddle walls, revetment. Surplus weirs. Tank sluices. Closing breaches.

(12) *Sanitary Engineering*.—Elementary knowledge of water-supply and drainage systems.

[NOTE.—The above syllabus connotes Building drawing exercises, designs, and estimating.]

5. Mechanical Engineering.

(1) *Transmission of Motion and Power*.—Shafts, couplings, clutches, pedestals and wall fixings. Belts, ropes and pulleys. Telodynamic transmission. Toothed gearing, spur and bevel-wheels, rack and pinion, worm gearing. Cams. Examples of uses of above in ordinary machines.

(2) *Boilers*.—General description and management of Cornish, Lancashire, vertical, locomotive, flash and water-tube boilers. Feedheaters, economizers, superheaters and other accessories and mountings.

(3) *Steam and other Heat Engines*.—Description and method of working of stationary and locomotive engines. Steam turbines. Gas and oil engines. Engine accessories and details:—condensers, air and circulating pumps, cylinders, pistons, slide valves, governors, fly wheels, etc.

(4) *Hydraulic Machinery*.—General description of ordinary forms of force and centrifugal pumps, pulsometer and rams. Water wheels, parallel, outward and inward flow turbines. Presses and riveters. Hydraulic transmission of power, accumulators, valves, etc.

(5) *Machine Tools and Mechanical Manipulation*.—Cutting of metals. Surface plates, callipers and gauges. Arrangement of drilling, shaping, planing, slotting and milling machines. Lathes, turning and boring mills. Punching and shearing machines.

[NOTE.—The above syllabus connotes all Machine drawing and design.]

6. Surveying.

(1) *Chain, Compass and Plane Table*.—Ordinary surveying with chain, compass and plane table. Inaccessible points, obstructed lines, use of optical square and cross staff.

(2) *Level*.—Manipulation and adjustment of levels. Levelling. Contouring. Cross sections. Use of Abney's level, clinometer and ghauttracer. Setting out gradients for railways, canals and sewers.

(3) *Theodolite*.—Use and adjustment of theodolites. Simple triangulation and traversing. Gale's system. Setting out straight lines and curves in the field. Heights and distances, including curvature and simple refraction. Simple stadia measurements.

(4) *Topographical Drawing*.—Conventional signs, map drawing. Representation of ground by contours. Sections on contoured plans. Location of dams, roads and railways on contoured plans showing cuttings and embankments estimation of areas and volumes.

GENERAL DISTRIBUTION OF MARKS.

SUBORDINATE CLASS.

BRANCH I.

Mathematics.

	Arithmetic	Mensuration	Trigonometry	Algebra	Geometry	Marks.
	...	...	...	...	...	50
	...	...	...	...	...	100
	...	...	...	...	...	150
	...	...	...	...	...	100
	...	...	...	...	...	100
Total	...	...	...	...	...	500

BRANCH II.

Engineering.

	Applied mechanics	Geometrical drawing	Freehand and model drawing	Building drawing and estimating	Machine drawing	Surveying	Construction	Hydraulic Engineering	Mechanical Engineering	Workshops	Physical exercises	Marks.
	...	...	...	...	...	...	...	...	...	...	...	300
	...	...	...	...	...	...	...	...	...	...	...	200
	...	...	...	...	...	...	...	...	...	...	...	100
	...	...	...	...	...	...	...	...	...	...	...	300
	...	...	...	...	...	...	...	...	...	...	...	150
	...	...	...	...	...	...	...	...	...	...	...	400
	...	...	...	...	...	...	...	...	...	...	...	250
	...	...	...	...	...	...	...	...	...	...	...	200
	...	...	...	...	...	...	...	...	...	...	...	150
	...	...	...	...	...	...	...	...	...	...	...	300
	...	...	...	...	...	...	...	...	...	...	...	150
Total	...	...	...	...	...	...	...	...	...	...	...	2,500
Grand total	...	...	...	...	...	...	...	...	...	...	...	3,000

Distribution of marks during the course—Subordinate Class.

Subject.	First year.		Second year.		Third year.	
	Practical.	Examination.	Practical.	Examination.	Practical.	Examination.
BRANCH I.						
Arithmetic	..	50	..	..	..	..
Mensuration	..	50	..	50	..	..
Trigonometry	..	50	..	100	..	..
Algebra	..	..	..	100	..	..
Geometry	..	50	..	50	..	..
Total	..	200	..	300	..	..
BRANCH II.						
Applied mechanics	25	25	25	75	50	100
Geometrical drawing	25	75	25	75	..	..
Freehand and model drawing	50	50	..	..	..	..
Building drawing	25	25	50	50	75	75
Machine drawing	25	25	50	50	..	..
Surveying	150	..	100	..	100	50
Construction	25	50	25	50	25	75
Hydraulic Engineering	..	..	25	50	25	100
Mechanical Engineering	25	25	25	75	..	..
Workshops	100	..	100	..	100	..
Physical exercise	50	..	50	..	50	..
Total	500	275	475	425	425	400
Grand total				3,000.		

Order—No. 1018, Law (Education), dated 11th July 1921.

The Government approve the revised syllabus for the new Subordinate Class in the College of Engineering, Madras, submitted with the Director's letter read above.

(By Order of the Government, Ministry of Education)

R. RAMACHANDRA RAO,
Secretary to Government.

To the Director of Public Instruction.
" Public Works Department.
" Publicity Officer.
Editors' Table.

LAW (EDUCATION) DEPARTMENT.

NOTES CONNECTED WITH G.O. No. 1018, LAW (EDUCATION),
DATED 11TH JULY 1921

[SUBJECT.—*Constitution of the Subordinate Engineering service.*]

PUBLIC WORKS DEPARTMENT.

In paragraph 16 of their letter No. 441 E.A., dated 16th July 1920, on pages 9 and 10 of G.O. No. 1284 W., dated 21st August 1920, the Government of India authorize Local Governments to proceed with the formation of a new subordinate service, the initial pay of which they state should be not less than Rs. 60. They consider it very desirable that the service should be organized on a time-scale basis with strict efficiency bars at suitable periods of service. They also state that the qualifications for admission to the service should as far as possible approximate to those at present required in the Upper Subordinate Service and that the course of training at the engineering institutions should be revised, if necessary, to ensure that men with suitable qualifications are available for appointment.

2. At present, Executive Lower Subordinates start on a pay of Rs. 30 and rise to a maximum of Rs. 80. The service is divided into 8 grades * on fixed rates of pay. Draughtsman lower subordinates also get the same pay, and a few of them have the chance of rising to the upper subordinate grades, mainly up to Rs. 150 †. These rates of pay were fixed in 1913 but even then gave rise to intense dissatisfaction among the lower subordinates who submitted memorials for the improvement of their pay and prospects at various times as shown below :—

	Date of receipt.
(1) Memorials from certain draughtsmen lower subordinate ...	January and February 1914.
(2) Do. do. ...	September 1914.
(3) Memorials from lower subordinates employed on executive work ...	1914.
(4) Memorials from lower subordinates of the II Circle employed on executive as well as drawing work ...	May and June 1917.
(5) Memorials from draughtsmen lower subordinates of the V and VII Circles ...	January 1918.
(6) Memorials from lower subordinates of the department employed on executive as well as on drawing duties ...	March 1918 to February 1919.
(7) Memorials from draughtsmen lower subordinates of the VI Circle ...	December 1918.
(8) Memorials from lower subordinates ...	March and April 1919.
(9) Memorials from lower subordinates, III, IV and VI Circles ...	November 1919.
(10) Memorials from lower subordinates, I Circle ...	June 1920.

In G.O. No. 486 W., dated 3rd March 1914, the draughtsmen lower subordinates were told that it was intended to examine the working of the reorganization in a few months and that the memorials would then be taken into consideration.

The Executive Lower Subordinates were told in G.O. No. 2543 W., dated 23rd December 1914, that their requests were receiving consideration and that orders of Government thereon would be issued in due course.

In connexion with the examination of the reports received from Superintending Engineers on the working of the reorganization schemes introduced in 1913-14, it

was considered that there was a strong case for reorganizing the Sub-Overseer establishment ‡ but owing to the financial stringency due to the war, the proposals were ordered to lie over. All memorials received subsequently have also been lying over.

In reply to a question in the Legislative Council in April 1919, the Government admitted that the examination of the earlier memorials disclosed a prima facie case for further reorganization but said that proposals to that end were held over owing

to the financial stringency due to war conditions. It will thus be seen that the lower subordinate establishment has had a real grievance for the past 8 years in respect of their pay and prospects. The reorganization which was obviously necessary has been thus lying over for years and has created discontent which should have been met much earlier than 1920. For this reason it is considered that as has been

W.H.—23-12-20. | done in other services, the present reorganization should be ante-dated.

4. The course of training for lower subordinates in the College of Engineering, Madras, extends over three years, and for upper subordinates over four years with an additional year of practical training on works in the department. The qualifications

And therefore their pay should also approximate. | of the subordinates of the future, should, it is stated, approximate to those at present required for upper subordinates.

W.H.—23-12-20.

The first point to be considered therefore

is in what respect the course of training in the Engineering College should be revised. It is proposed to so alter the course of training as to make it approximate to the present course of training for upper subordinates, with only this difference, viz., that the course will in future extend to four years instead of five years as is the case with upper subordinates at present. The new course will consist of a three years' course in the College corresponding to the present course for upper subordinates, the

A | fourth year being spent on practical training in the department partly on works and partly in the drawing office, as the drawing staff as well as the executive staff of subordinates will be recruited from this class. The students may be given stipends during the fourth year as is now done in the case of upper subordinate students under training. This question will be separately referred to the Home (Education) Department for early consideration in consultation with the Director of Public Instruction and the Principal of the College of Engineering.

W. HUTTON—23-12-20.

HOME (EDUCATION) DEPARTMENT.

The Director of Public Instruction may be requested u.o. to offer his remarks in consultation with the Principal, College of Engineering, in regard to the question raised in paragraph 4 of the Public Works Department note above for the revision of the lower subordinate course in the College of Engineering, Madras.

K.A.—27-1-21.

C. RAMANUJA ACHARIYAR—28-1-21.

OFFICE OF THE DIRECTOR OF PUBLIC INSTRUCTION.

U.O. No. 39, dated 31st January 1921.

I have spoken to the Principal about this. He points out that the old upper subordinates had four years in the college, while the subordinates now will have only three, and that it will be impossible for the new men to go through the full upper subordinate course having a year less and being men of similar qualifications to the old class of men admitted to the college. The principal has promised to consider the question of a revised syllabus and this, I take it, is the action which the Chief Engineer wishes to be taken.

R. G. GRIEVE—30-1-21.

LAW (EDUCATION) DEPARTMENT.

Attention is solicited to—

(1) paragraph 9 of the Government of India Letter No. 979, dated 10th January 1919 on page 3 of G.O. No. 1464, dated 25th November 1919,

(2) paragraph 9 of letter from the Principal, College of Engineering, R.C. No. 895, dated 27th February 1919, on page 8 of the Government order, and

(3) paragraph 9 of the letter to India No. 1465, dated 25th November 1919.

Please see also pages 22 and 23 of notes to the above.

The recommendation of the Public Works Department Reorganisation Committee that the period of training for subordinate students should extend over four years including one year of practical training has been considered and accepted by this Government.

The Director of Public Instruction may be requested u.o. to give effect to the proposal already approved by Government and to submit the revised syllabus promised by the principal.

K.A.—12-2-21.

N.K.—16-2-21.

C. RAMANUJA ACHARIYAR—17-2-21.

R. RAMACHANDRA RAO—18-2-21.

OFFICE OF THE DIRECTOR OF PUBLIC INSTRUCTION.

The principal has promised to let me have the revised syllabus by the 23rd instant.

R. G. GRIEVE—15-3-21.

HOME (EDUCATION) DEPARTMENT.

From the Director of Public Instruction, R.O.C. No. 5114/20, dated 27th March 1921.

The Director of Public Instruction has submitted a revised syllabus for the new subordinate class. The remarks of the Chief Engineer may be invited u.o. in the first instance as to whether the revised syllabus submitted by the Director of Public Instruction will be suitable.

K.A.—7-4-21.

S.A.—7-4-21.

C.R.—14-4-21.

R.R.—22-4-21.

PUBLIC WORKS DEPARTMENT.

Submitted. The existing syllabuses for the upper and lower subordinate classes will be found on pages 11 to 16 of G.O. No. 517, Home (Education), dated 4th June 1913.

2. It is submitted in this connexion that it has also been decided to constitute a class for the training of 'draughtsmen' in future, in the College of Engineering. It will be seen from the extract of the notes that 'draughtsmen' students should be taught in the college for a period of two years along with the students of the new subordinate class. After completing this college course, the draughtsmen students should be posted for a year for practical training on works and given stipends. The revised syllabus for the new subordinate class forwarded by the Principal, College of Engineering, will therefore have to be modified where necessary to suit both the purposes.

S.J.—7-5-21.

A.S.N.—7-5-21.

Vide portion marked A above.

From the note A on page 2 ante it appears that Secretary contemplated the draughtsmen taking the same four years course as the executive subordinates.

If the draughtsmen are only to attend the first two years of the course, it will be necessary to ask the Principal of the Engineering College to prepare a syllabus for approval showing how this work will be divided over the three years. If this is not done, it might be that the instruction which would be of most use to draughtsmen could be given on the third year's course which they would not attend.

It would be better, if it would be arranged, for the draughtsmen to have a special course throughout except perhaps for the first year.

J. S. WESTERDALE—9-5-21.

Since the note dated 23rd December 1920 was written it has been decided in communication with Financial that we should revert to the old system of training draughtsmen as draughtsmen and give them a draughtsman's certificate and not an executive subordinate's certificate.

Mr. Cartwright did not anticipate any difficulty in arranging for the training of these men—vide extract of notes connected with the creation of a new draughtsmen service.

I suggest the revised syllabus be referred back to the Director of Public Instruction with a copy of note and he be asked if the revised syllabus should be altered and if so in what manner so as to permit the future draughtsmen to take the first two years course of the new subordinate class or whether it would be advisable to train these draughtsmen students in separate classes under a separate syllabus.

W. HUTTON—17-5-21.

Ref on Cur No. 340 of 21

College of Engineering, Guindy

dated 23rd March 1921

From

C.L. Cartwright Esquire,

Ag: Principal,

College of Engineering, Guindy

To

The Director of Public Instruction,

Madras

Sir,

With reference to your telephone message of 15th March 1921 I have the honour to submit for approval a revised syllabus for the new Subordinate class. In working out this syllabus, I have endeavoured to meet the wishes of Government as far as possible by trying to raise the standard of the work now done by the Lower Subordinate class to that prescribed for the Upper Subordinates in so far as the shortening of the length of the course will permit. It has also been found necessary to revise the list of marks allotted to the various subjects in this course and I am submitting this revised mark list in a separate sheet.

I have the honour to be, &c.

/Signed/ C.L. Cartwright.

/True copy/

For Director of Public Instruction.

n.v.s.

G.O. No. 1018, 11th July 1921

College of Engineering, Madras

Revised syllabus for the new Subordinate class—Appointed

7 READ—the following paper:—

Letter—from R. G. GRIEVE, Esq., M.A., F.R.G.S.M.L.C., Acting Director of Public Instruction.

To—the Secretary to Government, Home (Education) Department.

Dated—Madras, the 27th March 1921.

No.—5114/20.

In continuation of my letter Ref. on Cur. No. 5114, dated 12th March 1921, I have the honour to submit for the approval of Government a revised syllabus for the new subordinate class together with a copy of letter of the Principal, College of Engineering, Guindy, Ref. on Cur. No. 340, dated 23rd March 1921.

ENCLOSURE

BRANCH I.

SUBORDINATE CLASS.

Mathematics.

Arithmetic.—Labour saving methods in computation. Use of decimals in preference to vulgar fractions for practical calculations. Contracted multiplication and division. Evaluation of simple surd forms. Limits of error. Use of logarithmic tables. Graphical solution of simple arithmetical problems.

Mensuration.—Area and perimeter of plane rectilinear figures. Area of an ellipse, a circle, a sector, and a segment of a circle. Circumference of a circle. Length of an arc of a circle. Areas and perimeters of similar figures. Area of an irregular plane figure by mid-ordinate rule and Simpson's rule. Surface and volume of prism, by linder, pyramid, cone, sphere, ring. Surface and volume of frusta of prisms/pyramids, cones and of sectors and segments of spheres. Volume of prismoids. Surfaces and volumes of similar solids. Volume of an irregular solid by Simpson's rule and by plotting ordinates representing areas of cross sections. Volumes of solids by weight of displacement. Estimation of areas, volumes, and surfaces from actual measurements of objects.

Plane Trigonometry.—Measurement of angles in degrees and radians. Definitions of the trigonometrical ratios of an angle and graphical determination of their values. Setting out angles from values of sine, cosine, etc. Relations between trigonometrical ratios of complementary and supplementary angles. Graphs of trigonometrical ratios. Functions of compound angles. Easy identities and equations. Graphical solution of equations. Relations between the sides and angles of a triangle. Use of tables of natural sines, cosines, etc., and of logarithmic sines, cosines, etc. Solution of triangles. Applications to heights and distances, etc. Lengths of the radii of the circumscribed, inscribed and escribed circles of a triangle in terms of the sides. Areas of regular polygons. Areas of a sector and segment of a circle.

Algebra.—Factorisation. Simplification. Rules of indices. Easy problems leading to simple and quadratic equations. Determination of constants in equations of known form such as $y = mx + n$, $y = ax^2 + bx + c$. Arithmetical Progression. Geometrical Progression. Graphs of simple functions such as $y = mx + n$, $y = ax^2 + bx + c$, $y = a^x$, $y = (x-a)(x-b)(x-c)$. Graphical solution of equations and problems, and graphical determination of maximum and minimum values. Plotting observations. Probable intermediate values.

Geometry.—The inscribed, escribed and circumscribed circles of a triangle. To describe the following regular polygons (1) on a given base, (2) in a given circle, (3) about a given circle:—(a) square, octagon, (b) equilateral triangles, hexagon, (c) pentagon, decagon. The inscribed and circumscribed circles of regular polygons.

Proportional division of straight lines. To find a third proportional to two given straight lines. To find a fourth proportional to three given straight lines. To find a mean proportional to two given straight lines. To describe a triangle equiangular to a given triangle (1) on a given base, (2) in a given circle and (3) about a given circle.

Pure

Practical

28.4

Proofs of the following Theorems.—If a straight line is drawn parallel to one side of the triangle it divides the other two sides proportionally; and the converse. If two triangles are equiangular, their corresponding sides are proportional; and the converse. If two triangles have one angle of the one equal to one angle of the other and the sides about these angles proportional, the triangles are similar.

The areas of similar triangles are proportional to the squares on corresponding sides. The internal bisector of an angle of a triangle divides the opposite side in the ratio of the sides containing the angle, and likewise the external bisector externally.

If the vertical angle of a triangle be bisected by a straight line which cuts the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the segments of the base together with the square on the straight line which bisects the angle.

If from the vertical angle of a triangle a straight line is drawn perpendicular to the base the rectangle contained by the sides of the triangle is equal to the rectangle contained by the perpendicular and the diameter of the circum circle.

BRANCH II.

ENGINEERING.

1. Drawing.

(1) *Free-hand* and (2) *Model Drawing*.—Ornamental outlines. Application of elementary perspective to model drawing of simple objects.

(3) *Geometrical Drawing*.—(a) *Practical Plane Geometry*.—Elementary problems dealing with lines, triangles, quadrilaterals, circles; polygons; Methods of construction and problems relating thereto. Tangents; Inscribed and Described figures; Proportional lines and angles; Areas of plane Figures. Plane Curves; Parabola, Ellipse and Hyperbola; Methods of drawing and chief properties. Cycloidal, spiral and other common curves.

(b) *Practical Solid Geometry and Projection*.—Lines, points, and simple problems on planes. Projection of simple solids; The regular solids; Sections of solids; Development of plane and curved surfaces; Simple problems on Interpenetration of solids; Isometric Projection; Elements of Perspective.

Machine Drawing.—Ability to copy accurately to scale and supply additional views; Drawings of simple machine parts from sketches: Ability to supply some idea of the proportions of the more simple machine details such as bolts, nuts, keys, cotter, etc.

Building Drawing.—See note to syllabuses on Construction and Hydraulic Engineering.

[Note.—*Machine Drawing, Building Drawing and Hydraulic Engineering Drawing and Estimating*—Special teaching in these subjects will be given during the courses of lectures in which Mechanical Engineering, Construction and Hydraulic Engineering are respectively taught. Marks will be allotted by the College for the drawing work done by students during these courses. A paper will also be set in each of the above three branches of drawing.]

2. Applied Mechanics.

(1) Mechanical Properties of Engineering Materials; Stress and Strain; Modulus of Elasticity; Elastic Limit; Ultimate Strength; Factor of Safety and Working Stress.

(2) Statics and applications to structures; Coplanar Forces; Parallelogram, Triangle and Polygon of Forces; Applications by graphical methods to simple frames with Pin joints, such as Cranes, etc. Wind pressure on roofs.

(3) Elementary Study of Beams; Bending Moment and Shearing Force; Sections in iron, steel and wood.

(4) Struts and columns; formulæ of Gordon and Euler.

(5) Simple Shear and Torsion; Strength of Shafts.

(6) Elementary application of theory in design of small bridges and arches generally, retaining walls and dams.

(7) Principle of work; potential and kinetic energy; Centrifugal force.

3. Construction.

Materials.

(1) *Stone*.—Varieties met with in Southern India. Quarrying. Blasting with powder and dynamite. Dressing. Average strength and weight of stone.

(2) *Bricks and Tiles*.—Brick earth. Tempering. Hand and machine moulding. Drying. Burning in clamps and kilns. Hoffman's kiln. Coloured bricks and tiles. Pressed bricks. Roofing, flooring and drain tiles. Fire bricks. Average strength and weight of brick. Characteristics of good bricks and tiles.

(3) *Line, Cement, Mortar, Concrete, Plaster*.—Sources and properties of lime. Burning in intermittent and running kilns. Slaking mortar mixing. Fat and Hydraulic limes. Portland cement manufactured in England and in Madras. Hydraulic mortar. Surki. Concrete. Practical tests for limes and cements. Strength of mortars and concretes. Plaster and plastering. Pointing. White and colour washing.

(4) *Timber*.—Growth. Felling. Seasoning, natural and artificial. Conversion. Preservation of timber. Varieties of timber used in Southern India—teak, sal, erool, karimaridoo, padowke, vengay, benteak, aynee, red and white cedar, rose-wood, casuarina, mango, palmyra, cocconut, bamboo. Strength and weight of timber. Characteristics of good timber.

(5) *Metals*.—Iron Ores. Smelting. Grey and white pig iron. Castings. Pipes and columns of cast-iron. Chilled castings. Strength of cast-iron. Brief description of the manufacture of wrought-iron. Forms of wrought-iron. Galvanized and corrugated iron. Tests and strength of wrought-iron. Rivets and bolts. Punching and drilling holes. Riveting. Cutting plates and bars. Welding. Steel, hard and mild. The Bessemer process. Strength of steel. Copper. Zinc. Lead. Tin. Alloys. Soldering metals.

(6) *Paints and Varnishes*.—Ingredients of paint. Litharge. Turpentine. Linseed oil. Mixing paint. Painting old and new work. Wood oil. Coal tar. Distemper. Varnish. Papering. Putty. Glazing.

Design.

(1) *Masonry*.—Coursed and uncoursed rubble. Block in course. Ashlar. String courses. Copings. Bricklaying. English and Flemish bonds. Bond at angles of walls, in footings with offsets, between main and cross walls, at door and window opening and in circular pillars. Foundations and footings. Plinth. Damp proof course. Thickness of main and cross walls. Wall plates. Wood bricks and plugs. Openings for timber beams, for doors and windows. Corbelling. Flat, segmental, pointed and relieving brick arches. Inverts. Centres for small arches. Bond in brick and stone arches. Small oblique arches. Enclosure walls. Buttresses and counterforts. Retaining and breast walls. Scaffolding.

(2) *Foundations*.—Excavation. Masonry and concrete foundations. Unequal settlement. Pressure on soil under foundations. Foundations in rock, good and bad soils. Piles. Cofferdams and caissons. Well foundations. Brick and iron wells. Mode of sinking wells. Patent excavators for well sinking. Setting out buildings from working plans.

(3) *Carpentry*.—Mortice and tenon joint. Fishing and scarfing. Iron straps and bolts. Roof and bridge frames, nature of stress in the different members. Details of joints. Frames of timber and iron combined. Trussed beams. Timber floors. Stairs, designing and setting out. Doors and windows. Centerings for arches. Striking centres.

(4) *Roofs and Floors*.—Terrace-roofs and floors on joists, beams and joists, or iron girders and joists. Bengal terrace roofs. Fire-proof floors. Brick arched roofs. Pitched roofs. Couples. Trusses. Rafters, purlins and reapers. Roof coverings of thatch, tiles, slates and shingles. Ceilings. Floors of stone, brick, tiles, concrete, timber and asphalt. Simple forms of iron roof. Use of tee, angle and channel iron in compression, and of rods and flat bars in tension. Joints and connexions. Shoes rivets, bolts. Iron and timber purlins. Brackets. Patent tiles, corrugated iron, lead and zinc roofing. Modes of attachment. Ventilators.

(5) *Bridges*.—Names of parts. Thickness of arch-ring, wing-walls, centerings. Setting out arches full size.

(6) *Roads*.—Road construction and maintenance.

(7) *Reinforced concrete*.—Simple designs, lintels, slabs, T beams, columns and simple foundations.

[NOTE.—The above syllabus connotes Building drawing exercises designs, and estimating.]

4. *Hydraulic Engineering.*

(1) *Hydrostatics*.—Hydrostatic laws. Pressure at a point and on a surface. Equal transmission of pressure. Atmospheric pressure. Siphon. Specific gravity. Flotation.

(2) *Discharge from Orifices and Notches*.—Small orifices. Velocity of discharge. Co-efficients of velocity, contraction and discharge. Rectangular orifice and notch. Triangular notch. Velocity of approach. Submerged and partly submerged orifices. Submerged notch.

(3) *Practical Cases*.—Tank weirs. Drowned weirs. Gauging weirs. Anicuts. Sluices: head, under, lock and tank. Modules.

(4) *Discharge under Variable Head*.—Free discharge from prismatic vessels. Time of emptying or filling locks. Discharge from one prismatic vessel into another.

(5) *Flow in Pipes*.—Fluid friction. Velocity in pipes. Virtual slope. Discharge. In-nation of pipes. Pipes not running full.

(6) *Flow in channels*.—Sections for channels. Co-efficients. Discharge of channels. Practical data. Channels of minimum border. Falls.

(7) *Rivers*.—Cross sections. Measurement of velocity and discharge. Flood discharge from catchment basins. Bends. Regime of rivers.

(8) *Storage and Distribution*.—Irrigation, navigation and town supply. Rainfall. Supply from wells, rivers and reservoirs.

- (9) *Masonry Works in Irrigation Projects.*
 (10) *Canals and Channels.*—Irrigation in deltas and elsewhere. Supply from rivers. Storage in tanks. Capacity of channel. Limiting velocity. Surface fall. Side slopes. Alignment. Cross drainage. Navigation canals.
 (11) *Tanks.*—Isolated rain-fed tanks. Tanks in groups. Tanks supplied from rivers or streams. Catchment and capacity of a tank. Irrigating duty of water. Tank bunds, puddle walls, revetment. Surplus weirs. Tank sluices. Closing breaches.
 (12) *Sanitary Engineering.*—Elementary knowledge of water-supply and drainage systems.

[NOTE.—The above syllabus connotes Building drawing exercises, designs, and estimating.]

5. *Mechanical Engineering.*

- (1) *Transmission of Motion and Power.*—Shafts, couplings, clutches, pedestals and wall fixings. Belts, ropes and pulleys. Telodynamic transmission. Toothed gearing, spur and bevel-wheels, rack and pinion, worm gearing. Cams. Examples of uses of above in ordinary machines.
 (2) *Boilers.*—General description and management of Cornish, Lancashire, vertical, locomotive, flash and water-tube boilers. Feedheaters, economizers, superheaters and other accessories and mountings.
 (3) *Steam and other Heat Engines.*—Description and method of working of stationary and locomotive engines. Steam turbines. Gas and oil engines. Engine accessories and details:—condensers, air and circulating pumps, cylinders, pistons, slide valves, governors, fly wheels, etc.
 (4) *Hydraulic Machinery.*—General description of ordinary forms of force and centrifugal pumps, pulsometer and rams. Water wheels, parallel, outward and inward flow turbines. Presses and riveters. Hydraulic transmission of power, accumulators, valves, etc.
 (5) *Machine Tools and Mechanical Manipulation.*—Cutting of metals. Surface plates, callipers and gauges. Arrangement of drilling, shaping, planing, slotting and milling machines. Lathes, turning and boring mills. Punching and shearing machines.

[NOTE.—The above syllabus connotes all Machine drawing and design.]

6. *Surveying.*

- (1) *Chain, Compass and Plane Table.*—Ordinary surveying with chain, compass and plane table. Inaccessible points, obstructed lines, use of optical square and cross staff.
 (2) *Level.*—Manipulation and adjustment of levels. Levelling. Contouring. Cross sections. Use of Abney's level, clinometer and ghautraer. Setting out gradients for railways, canals and sewers.
 (3) *Theodolite.*—Use and adjustment of theodolites. Simple triangulation and traversing. Gale's system. Setting out straight lines and curves in the field. Heights and distances, including curvature and simple refraction. Simple stadia measurements.
 (4) *Topographical Drawing.*—Conventional signs, map drawing. Representation of ground by contours. Sections on contoured plans. Location of dams, roads and railways on contoured plans showing cuttings and embankments estimation of areas and volumes.

No. 1018, LAW (EDUCATION), 11TH JULY 1921
GENERAL DISTRIBUTION OF MARKS.
SUBORDINATE CLASS.

5

BRANCH I.
Mathematics.

	MARKS.
Arithmetic	50
Mensuration	100
Trigonometry	150
Algebra	100
Geometry	100
Total	500

BRANCH II.
Engineering.

Applied mechanics	300
Geometrical drawing	200
Freehand and model drawing	100
Building drawing and estimating	300
Machine drawing	150
Surveying	400
Construction	250
Hydraulic Engineering	200
Mechanical Engineering	150
Workshops	300
Physical exercises	150
Total	2,500
Grand total	3,000

Distribution of marks during the course—Subordinate Class.

Subject.	First year.		Second year.		Third year.	
	Practical.	Examination.	Practical.	Examination.	Practical.	Examination.
BRANCH I.						
Arithmetic	..	50	..	..	..	..
Mensuration	..	50	..	50	..	..
Trigonometry	..	50	..	100	..	..
Algebra	..	..	..	100	..	..
Geometry	..	50	..	50	..	..
Total	..	200	..	300	..	..
BRANCH II.						
Applied mechanics	25	25	25	75	50	100
Geometrical drawing	25	75	25	75	..	..
Freehand and model drawing	50	50	..	..	..	..
Building drawing	25	25	50	50	75	75
Machine drawing	25	25	50	50	..	..
Surveying	150	..	100	..	100	50
Construction	25	50	25	50	25	75
Hydraulic Engineering	..	..	25	50	25	100
Mechanical Engineering	25	25	25	75	..	..
Workshops	100	..	100	..	100	..
Physical exercise	50	..	50	..	50	..
Total	500	275	475	425	425	400
Grand total ..				3,000.		

Order—No. 1018, Law (Education), dated 11th July 1921.

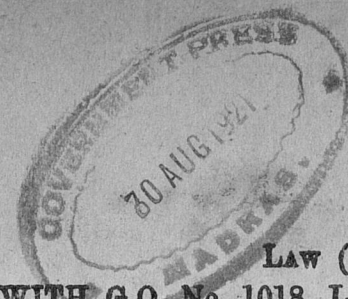
The Government approve the revised syllabus for the new Subordinate Class in the College of Engineering, Madras, submitted with the Director's letter read above.

(By Order of the Government, Ministry of Education)

R. RAMACHANDRA RAO,
Secretary to Government.

To the Director of Public Instruction,
Public Works Department,
Publicity Officer.

ditto Table.



14

LAW (EDUCATION) DEPARTMENT.
NOTES CONNECTED WITH G.O. No. 1018, LAW (EDUCATION),
DATED 11th JULY 1921

[SUBJECT.—Constitution of the Subordinate Engineering service.]

PUBLIC WORKS DEPARTMENT.

In paragraph 16 of their letter No. 441 E.A., dated 16th July 1920, on pages 9 and 10 of G.O. No. 1284 W., dated 21st August 1920, the Government of India authorize Local Governments to proceed with the formation of a new subordinate service, the initial pay of which they state should be not less than Rs. 60. They consider it very desirable that the service should be organized on a time-scale basis with strict efficiency bars at suitable periods of service. They also state that the qualifications for admission to the service should as far as possible approximate to those at present required in the Upper Subordinate Service and that the course of training at the engineering institutions should be revised, if necessary, to ensure that men with suitable qualifications are available for appointment.

2. At present, Executive Lower Subordinates start on a pay of Rs. 30 and rise to a maximum of Rs. 80. The service is divided into 8 grades * on fixed rates of pay. Draughtsman lower subordinates also get the same pay, and a few of them have the chance of rising to the upper subordinate grades, mainly up to Rs. 150 †. These rates of pay were fixed in 1913 but even then gave rise to intense dissatisfaction among the lower subordinates who submitted memorials for the improvement of their pay and prospects at various times as shown below :—

	Date of receipt.
(1) Memorials from certain draughtsmen lower subordinate ...	January and February 1914.
(2) Do. do. ...	September 1914.
(3) Memorials from lower subordinates employed on executive work ...	1914.
(4) Memorials from lower subordinates of the II Circle employed on executive as well as drawing work ...	May and June 1917.
(5) Memorials from draughtsmen lower subordinates of the V and VII Circles ...	January 1918.
(6) Memorials from lower subordinates of the department employed on executive as well as on drawing duties ...	March 1918 to February 1919.
(7) Memorials from draughtsmen lower subordinates of the VI Circle ...	December 1918.
(8) Memorials from lower subordinates ...	March and April 1919.
(9) Memorials from lower subordinates, III, IV and VI Circles ...	November 1919.
(10) Memorials from lower subordinates, I Circle ...	June 1920.

In G.O. No. 486 W., dated 3rd March 1914, the draughtsmen lower subordinates were told that it was intended to examine the working of the reorganization in a few months and that the memorials would then be taken into consideration.

Pres
Please strike off

29.8.24

24
28.8.
29.8.

KP

The Executive Lower Subordinates were told in G.O. No. 2543 W., dated 23rd December 1914 that their requests were receiving consideration and that orders of Government thereon would be issued in due course.

In connexion with the examination of the reports received from Superintending Engineers on the working of the reorganization schemes introduced in 1913-14, it was considered that there was a strong case for reorganizing the Sub-Overseer establishment* but owing to the financial stringency due to the war, the proposals were ordered to lie over. All memorials received subsequently have also been lying over.

* Includes both draughtsmen and Executive Lower Subordinates.

In reply to a question in the Legislative Council in April 1919, the Government admitted that the examination of the earlier memorials disclosed a prima facie case for further reorganization but said that proposals to that end were held over owing to the financial stringency due to war conditions. It will thus be seen that the lower subordinate establishment has had a real grievance for the past 8 years in respect of their pay and prospects. The reorganization which was obviously necessary has been thus lying over for years and has created discontent which should have been met much earlier than 1920. For this reason it is considered that as has been

W.H.—23-12-20.

done in other services, the present reorganization should be ante-dated.

4. The course of training for lower subordinates in the College of Engineering, Madras, extends over three years, and for upper subordinates over four years with an additional year of practical training on works in the department. The qualifications

And therefore their pay should also approximate.

W.H.—23-12-20.

of the subordinates of the future, should, it is stated, approximate to those at present required for upper subordinates. The first point to be considered therefore

is in what respect the course of training in the Engineering College should be revised. It is proposed to so alter the course of training as to make it approximate to the present course of training for upper subordinates, with only this difference, viz., that the course will in future extend to four years instead of five years as is the case with upper subordinates at present. The new course will consist of a three years' course in the College corresponding to the present course for upper subordinates, the fourth year being spent on practical training in the department partly on works and partly in the drawing office, as the drawing staff as well as the executive staff of subordinates will be recruited from this class. The students may be given stipends during the fourth year as is now done in the case of upper subordinate students under training. This question will be separately referred to the Home (Education) Department for early consideration in consultation with the Director of Public Instruction and the Principal of the College of Engineering.

W. HUTTON—23-12-20.

HOME (EDUCATION) DEPARTMENT.

The Director of Public Instruction may be requested u.o. to offer his remarks in consultation with the Principal, College of Engineering, in regard to the question raised in paragraph 4 of the Public Works Department note above for the revision of the lower subordinate course in the College of Engineering, Madras.

K.A.—27-1-21.

C. RAMANUJA ACHARIYAR—28-1-21.

OFFICE OF THE DIRECTOR OF PUBLIC INSTRUCTION.

U.O. No. 39, dated 31st January 1921.

I have spoken to the Principal about this. He points out that the old upper subordinates had four years in the college, while the subordinates now will have only three, and that it will be impossible for the new men to go through the full upper subordinate course having a year less and being men of similar qualifications to the

old class of men admitted to the college. The principal has promised to consider the question of a revised syllabus and this, I take it, is the action which the Chief Engineer wishes to be taken.

R. G. GRIEVE—30-1-21.

LAW (EDUCATION) DEPARTMENT.

Attention is solicited to—

(1) paragraph 9 of the Government of India Letter No. 979, dated 10th January 1919 on page 3 of G.O. No. 1464, dated 25th November 1919,

(2) paragraph 9 of letter from the Principal, College of Engineering, R.C. No. 895, dated 27th February 1919, on page 8 of the Government order, and

(3) paragraph 9 of the letter to India No. 1465, dated 25th November 1919.

Please see also pages 22 and 23 of notes to the above.

The recommendation of the Public Works Department Reorganisation Committee that the period of training for subordinate students should extend over four years including one year of practical training has been considered and accepted by this Government.

The Director of Public Instruction may be requested u.o. to give effect to the proposal already approved by Government and to submit the revised syllabus promised by the principal.

K.A.—12-2-21.

N.K.—16-2-21.

C. RAMANUJA ACHARIYAR—17-2-21.

R. RAMACHANDRA RAO—18-2-21.

OFFICE OF THE DIRECTOR OF PUBLIC INSTRUCTION.

The principal has promised to let me have the revised syllabus by the 23rd instant.

R.G.G.—15-3-21.

HOME (EDUCATION) DEPARTMENT.

The communication may be awaited till the 10th April.

K.A.—30-3-21.

C.R.—31-3-21.

From the Director of Public Instruction, R.O.C. No. 5114/20, dated 27th March 1921.

The Director of Public Instruction has submitted a revised syllabus for the new subordinate class. The remarks of the Chief Engineer may be invited u.o. in the first instance as to whether the revised syllabus submitted by the Director of Public Instruction will be suitable.

K.A.—7-4-21.

S.A.—7-4-21.

C.R.—14-4-21. R.R.—22-4-21.

PUBLIC WORKS DEPARTMENT.

Submitted. The existing syllabuses for the upper and lower subordinate classes will be found on pages 11 to 16 of G.O. No. 517, Home (Education), dated 4th June 1913.

2. It is submitted in this connexion that it has also been decided to constitute a class for the training of 'draughtsmen' in future, in the College of Engineering. It will be seen from the extract of the notes that draughtsmen students should be taught in the college for a period of two years along with the students of the new subordinate class. After completing this college course, the draughtsmen students should be posted for a year for practical training on works and given stipends. The revised syllabus for the new subordinate class forwarded by the Principal, College of Engineering, will therefore have to be modified where necessary to suit both the purposes.

S.J.—7-5-21. A.S.N.—7-5-21.

Vide portion marked A above.

From the note A on page 2 ante it appears that Secretary contemplated the draughtsmen taking the same four years course as the executive subordinates.

If the draughtsmen are only to attend the first two years of the course, it will be necessary to ask the Principal of the Engineering College to prepare a syllabus for approval showing how this work will be divided over the three years. If this is not done, it might be that the instruction which would be of most use to draughtsmen would be given on the third year's course which they would not attend.

It would be better, if it would be arranged, for the draughtsmen to have a special course throughout except perhaps for the first year.

J. S. WESTERDALE—9-5-21.

Since the note dated 23rd December 1920 was written it has been decided in communication with Financial that we should revert to the old system of training draughtsmen as draughtsmen and give them a draughtsman's certificate and not an executive subordinate's certificate.

Mr. Cartwright did not anticipate any difficulty in arranging for the training of these men—vide extract of notes connected with the creation of a new draughtsmen service.

I suggest the revised syllabus be referred back to the Director of Public Instruction with a copy of note and he be asked if the revised syllabus should be altered and if so in what manner so as to permit the future draughtsmen to take the first two years course of the new subordinate class or whether it would be advisable to train these draughtsmen students in separate classes under a separate syllabus.

W. HUTTON—17-5-21.

LAW (EDUCATION) DEPARTMENT.

Submitted that the file may be sent u.o. to the Director of Public Instruction and he may be requested to offer his remarks on the question raised in the Public Works Department Secretary's note on page ante. If he considers that the future draughtsmen students may be permitted to undergo instruction along with the new subordinate class students for the first two years, he may be requested to have the syllabus revised if necessary, in consultation with the Principal of the College of Engineering and to submit it to Government as early as possible.

K.A.—23-5-21. S.A.—23-5-21.

C. RAMANUJA ACHARIYAR—25-5-21.

R. RAMACHANDRA RAO—31-5-21.

U.O. No. 302, dated 29th June 1921.

I have discussed this question with the Principal of the College of Engineering.

The period of training of the draughtsmen class proposed to be established should depend largely upon what is expected of the draughtsman after the completion of his training. If it is intended to turn out men who can draw and trace well from sketches and details supplied to them, but who are not expected to design on their own responsibility, it is considered that the period of training, viz., two years in the college and a year's practical course, will be sufficient. If, however, it is intended that students should themselves design, the Principal is strongly opposed to the formation of a class with this object in view. He does not consider that it is possible to give adequate training in the time proposed for the course.

In any case, it is advisable to keep the draughtsmen's class separate altogether from the new subordinate class, although it may be possible for students of the former class to attend some of the lectures or classes of the subordinate class.

As there is little more than a fortnight left before the reopening of the college, the Principal requests that orders may be passed on the revised syllabus as recommended by the Board of Visitors, last January, and now under the consideration of Government. It is impossible to have the current year's college calendar printed until orders on the revised syllabus are received.

NOTES TO G.O. No. 1018, Law (Education), 11th July 1921

5

It is suggested that the syllabus and particulars of the proposed draughtsmen's class be considered and issued separately. They can be incorporated in the college calendar next year.

R. LITTLEHAILES—24-6-21.

LAW (EDUCATION) DEPARTMENT.

21 This department may agree with the Director of Public Instruction that the syllabus for the proposed draughtsmen class may be considered separately. Submitted that the file may be sent to the Public Works Department for *very early* remarks as to whether the syllabus proposed for the new subordinate course will be suitable.

K.A.—2-7-21. N.K.—2-7-21.

C. RAMANUJA ACHARIYAR—3-7-21.

R. RAMACHANDRA RAO—4-7-21.

PUBLIC WORKS DEPARTMENT.

1-4/ The only question now referred to this department is whether the syllabus on pages 2-7 current file for the new subordinate class is suitable.

K.G.—7-7-21.

The syllabus for the new subordinate class may be approved.

J. S. WESTERDALE—7-1-21.

LAW (EDUCATION) DEPARTMENT.

A draft order is submitted.

E.A.V.—8-7-21.

N.K.—8-7-21.

C.R.—9-7-21.

Issue but do not lose sight of the necessity to frame a new syllabus for the draughtsmen's class.

R. RAMACHANDRA RAO—9-7-21.

[G.O. No. 1018, Law (Education), dated 11th July 1921.]

PRESS SLIP.

ORDINARY

PREFERENCE

URGENT (a).

Seott. II-38-1-17.

Law (201) DEPARTMENT.

Current No dated 191 ..

G.O. No. 1018, dated 11-7-191 ..

Number of MS. pages sent { (b) Correspondence 9+1 pages
(b) Notes 13 pages

Brief subject: Revised Syllabus - Subordinate class

(c) Number of copies required when struck off (not including copies for volumes and editors' table which are retained in the Press).	E. T. copies to supply requisitions for purchase by the public.	Complete correspondence and orders.	Notes.
--	---	-------------------------------------	--------

FOR RECORD.*			
Madras Records	...	4	20
Ooty Records	...		3
For filing with original	...		1
Total	..		24

For Issue.†

Signature copies	Letter only	Complete G.O.	(b) Special issue copies of G.O.		Notes
			No.	Papers.	
India Office		2			
Govt. of India					
Revenue Department					
Public Works Department					
Local and Municipal Department					
Educational Department					
Public Dept.					
Judicial Dept					
Political					
Financial Dept.					
Marine Dept.					
Ecclesiastical Dept.					
Total					

Spare copies	Letter only	Complete G.O.	(b) Special issue copies of G.O.		Notes
			No.	Papers.	
The		6			
The		2			
The		10			
The					
The					
The					
The					
The					
The					
The					
The					
The					
The					
Total		20			

Copies distributed on ‡ (Press Clerk).

† Copies distributed on ‡ (Press Despatcher).

† To be initialled and dated.

INSTRUCTIONS FOR THE SECRETARIAT.

(a) If a paper is marked to be printed urgently, the Superintendent of the section concerned should sign the Press slip. The Superintendent should exercise a careful discretion in the matter.

(b) Each letter, memorandum, or order, or set of orders, in the file of correspondence should be headed in succession with the Roman numeral I, II, III, etc., the number being written in red ink or blue chalk above the item. The particular papers to be printed in the special issue-copies should be indicated by the Roman numeral (I, II, etc.) by which that item has been headed in the correspondence file. All matter, including marginal remarks or references, to be printed should be written in ink and matter which should not be printed should be encircled. Initials and signatures that are not quite legible should be re-written distinctly.

(b) For rules regarding printing of notes, see rule 315 of the office Manual.

(c) The number of copies and the details of distribution should be filled in by the Superintendent or Referencer concerned.

(d) In the absence of special instructions to the Press to keep matter standing for a specified period, ordinary papers of 8 pages and under will be kept standing for one week, and larger papers for two weeks only. The type of notes and of all confidential papers is distributed immediately after striking.

(e) This slip, properly and completely filled in, should accompany every paper sent to Press; it will be returned by the Press when proofs are furnished; it should be sent to the Press when a call is made for revised proofs or when a corrected proof is sent for striking. When finally returned by Press it should be filed with the original order or letter.

INSTRUCTIONS FOR THE PRESS.

(a) If, in the opinion of the Superintendent of the Press, a paper has been marked urgent unnecessarily, he should send the Press slip to the Registrar with a remark to that effect.

(b) Unless a note to the contrary is made against the matter, pencil entries should not be printed. The Superintendent of the Press may bring to the notice of the Registrar any instance of incomplete or careless editing.

(c) Signature copies of letters to the Secretary of State or to the Government of India should be printed on hand-made paper.

(d) This slip should be returned by the Press to the Secretariat when proofs are furnished; it will be sent back to the Press when proofs are returned corrected and should be finally returned to the Secretariat when struck-off copies are supplied.

(e) The names of the Secretary and Members should be printed in full when they occur on the right hand side, only the first time when they appear on the left side, the initials alone being printed later.

TO PRESS, MADRAS OOTY.

A

Please send proof in duplicate. The papers have been carefully edited.

Ilharumth
13-7-24
Referencer.
Clerk.

M. S. S. S.
Supdt.
W. S. S.

B

Proof returned corrected. Please strike off and send number of copies as indicated.

Type may be released after usual interval at once.

Referencer.
Clerk.

Supdt.

C

As the matter is clear manuscript and has been carefully edited, (b) proof need not be sent. Please print and supply number of copies as indicated.

Type may be released after usual interval.

Referencer.
Clerk.

Supdt.

SPECIAL INSTRUCTIONS.

TO BE FILLED IN BY THE PRESS.

Diary.	Initials of Press official.
Received in Press on.....	15/7/24 <i>W. S. S.</i>
First proof furnished on.....	
Call for revised proof received on.....	
Revised proof furnished on.....	
Corrected proof received for striking on.....	
Final copies supplied on.....	

Account of copies.	Complete copies.	Notes.	Issue copies.	Special E.T. edition.
Supplied to Secretariat for Record.....				
" " " Issue.....				
" " " for Extra E.T. copies to supply requisitions for sale to the public.				4
For Volumes.....				
For supply to newspapers and institutions admitted to the privileges of the E.T.				
Total ...				