1941

Mechanical Engineering and Allied Trades : Prospectus, 1941-42

City of Dublin Vocational Education Committee

City of Dublin
Vocational Education Committee

Scoileanna Ceárd-Oideachais
City of Dublin Technical Schools

Seisiún
1941-42

Session
1941-42

Mechanical Engineering and Allied Trades

PROSPECTUS OF COURSES

BOLTON STREET

CALENDAR—SESSION 1941–42.

1941—SEPT. 1, MONDAY	Whole-time Day Schools open for enrolment, and Day Apprentice School resumes work.
SEPT. 8, MONDAY	Part-time Day Classes open for enrolment and Whole-time Day Schools commence work.
SEPT. 15, MONDAY	Evening classes open for enrolment and Part-time Day classes commence work.
SEPT. 22, MONDAY	Evening classes commence work.
NOV. 1, SATURDAY	*All Saints Day.* Whole-time Day Schools excepting Day Apprentice School and Special classes closed.
DEC. 8, MONDAY	*Feast of Immaculate Conception.* Whole-time Day Schools excepting Day Apprentice School and Special classes closed.
DEC. 13, SATURDAY	Teaching work in Whole-time Day Schools ceases—excepting Day Apprentice School and Special classes.
DEC. 15, MONDAY	Term Examinations in Whole-time Day Schools commence.
DEC. 20, SATURDAY	Last meeting of classes before Christmas Vacation.
1942—JAN. 5, MONDAY	All classes resume work after Christmas Vacation.
JAN. 6, TUESDAY	*Feast of the Epiphany.* Whole-time Day Schools excepting Day Apprentice School and Special classes closed.
MAR. 17, TUESDAY	*St. Patrick's Day.* Schools closed.
MAR. 31, TUESDAY	Last meeting of Day and Evening classes before Easter Vacation.
APR. 8, WEDNESDAY	All classes resume work after Easter Vacation.
MAY 1, FRIDAY	Evening classes close—excepting where otherwise arranged.
MAY 14, THURSDAY	*Ascension Day.* Whole-time Day Schools —excepting Day Apprentice School and Special classes—closed.
MAY 25, MONDAY	*Whit-Monday.* Schools closed.
JUNE 4, THURSDAY	*Feast of Corpus Christi.* Whole-time Day Schools—excepting Day Apprentice School and Special classes closed.
JUNE 20, SATURDAY	Teaching work ceases in Whole-time Day Schools excepting Day Apprentice School and Special classes.
JUNE 22, MONDAY	Sessional Examinations commence in Whole-time Day Schools excepting Day Apprentice School and Special classes.
JUNE 27, SATURDAY	Whole-time Day Schools and Part-time Day Domestic Economy classes close—excepting Day Apprentice School and Special classes.
JUNE 29, MONDAY	*Feast of Saints Peter and Paul.*
JULY 11, SATURDAY	Day Apprentice School and other classes close excepting where otherwise arranged

Schools closed on all Bank Holidays not specified in above Calendar

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CITY OF DUBLIN
VOCATIONAL EDUCATION COMMITTEE

Alderman C. Breathnach, LL.D., T.D. (*Chairman*), 384 Clontarf Road.
Councillor M. O'Sullivan, P.C. (*Vice-Chairman*), 74 Ballymun Road.
Councillor Mrs. K. Clarke, Baymount, 95 Clontarf Road.
Senator D. D. Healy, T.C., P.C., 40 Usher's Quay.
Councillor Mrs. M. Cosgrave, LL.A., 17 Park Drive, Cowper Gardens.
,, P. Belton, T.D., Bellevue Park, Killiney.
,, J. J. Byrne, B.A., B.L., 60 Talbot Street.
,, Fintan Burke, 4 Wilfield Road, Ballsbridge.
Miss Helena Molony, 48 Fleet Street.
Micheal O'Foghludha, 5 Cabra Road.
Mr. M. P. Rowan, 52 Capel Street.
Dr. Lorcan G. Sherlock, 18 Kildare Street.
Mr. W. J. Whelan, 35 Lower Gardiner Street.
Mr. Ml. Colgan, 6 Gardiner's Row.

Offices—

Technical Institute,
Bolton Street,
Dublin.

L. E. O'CARROLL, B.A., B.L.,
Chief Executive Officer.

LOCAL SUB-COMMITTEE, BOLTON STREET.

Alderman C. Breathnach, LL.D., T.D., 384 Clontarf Road (*ex-officio*).
Mr. R. Murphy, Messrs Hopkins and Hopkins, O'Connell Street.
Mr. W. J. Whelan, 35 Lower Gardiner Street.
Senator Sean Campbell, 35 Lower Gardiner Street.
Mr. Gerald Doyle, 32 East Essex Street.
Mr. Thos. Darcy, 91 Ceannt Fort, Mount Brown.
Mr. J. G. Wilson, 13 Sackville Place.
Mr. T. A. Crampton, Hammersmith Works, Ballsbridge.

ADVISORY SUB-COMMITTEE.

MASTER JEWELLERS.

Mr. G. Thornley.
Mr. R. Murphy.
Mr. Sleator.
Mr. J. Ryan.

GENERAL NOTICES.

Admission and Attendance.—The Evening Session opens on Monday, 15th September, 1941, when teachers will be present to advise applicants regarding suitable Courses of Study and to certify students' Entrance Forms.

Applicants for admission to Courses or Classes must be at least fourteen years of age. Pupils in attendance at Public Primary or Secondary Day Schools are not eligible for admission to evening classes.

Students, on enrolment, may be required, at the discretion of the Principal, to sit for an Entrance Examination. Introductory Classes are provided for those not sufficiently qualified to enter a full Technical Course.

Each student must present a *Class Ticket* before admission to a class.

The opening of a class will depend on the enrolment of a sufficient number of students.

A class may be discontinued at any time should the attendance fall below the number necessary to justify its continuance, and the number of evenings allotted weekly to a class may be reduced if there be a falling off in the attendance.

The name of a student who has been absent for three successive class meetings may be removed from the Register unless a note of explanation has been sent.

Students are required to come provided with a note-book and pencil or with such drawing instruments or other requisites as may be necessary for the work of the class.

Discipline.—Strict order must be observed at all times in the precincts of the School.

Students' Property.—The Vocational Education Committee do not accept responsibility for loss or damage to any property—bicycles, coats, hats, books, etc.—brought to the School by students.

Damage to Person.—The Committee do not accept responsibility for injury to a student resulting from the student's personal neglect or disregard of the Regulations laid down for the conduct of the operations in the workshops or laboratories.

MECHANICAL ENGINEERING DEPARTMENT.

The trade classes are primarily intended for those engaged in the respective trades. Others will not be admitted to practical classes before 7th November, and then only if there be room and on payment of a quadruple fee.

A workshop class can only be taken in conjunction with an approved Lecture or Drawing class. A student will not be permitted to continue in a workshop class if his attendance at the Lecture or Drawing class is unsatisfactory.

Students must make good any damage done by them to School property.

The Courses in Mechanical Engineering, Motor Car Engineering and Metal Plate Work are arranged in connection with the Technical Examination Syllabus of the Department of Education. They are not to be considered as arbitrary, and the subjects may be varied, with the sanction of the Principal, to suit the needs of individual students.

FEES.

All fees must be paid on enrolment.

	£	s.	d.	
General Courses or Single Subjects	–	7	6	for Session
Additional Subjects, each	–	2	6	,,
Introductory Courses	–	2	6	,,
Irish	–	2	6	,,
Motor Car Driving	2	0	0	for Course
Land Surveying	–	10	0	,,

SCHOOL OF

Mechanical Engineering
Motor Car Engineering
and Allied Trades

TECHNICAL INSTITUTE

BOLTON STREET

DUBLIN

MECHANICAL ENGINEERING DEPARTMENT

TECHNICAL SCHOOL, BOLTON STREET

TEACHING STAFF.

ERNEST E. JOYNT, M.I.MECH.E.—*Principal.*

A. M. MacLoughlin, B.A., A.R.C.SC.I.

W. D. Pile, A.M.I.M.E., M.I.A.E.

H. C. Clifton, B.A.

W. D. Horgan, B.A.

S. O Tuama, B.SC.

H. C. FitzGerald.

F. O'Kelly.

R. Bent.

P. Cormack, D.SC., M.R.I.A., A.M.I.M.E.

R. J. Dowling, A.M.I.M.E., A.M.I.C.E.I.

W. J. N. O'Brien, DIP.ING.

B. J. Dixon, B.SC., A.M.I.E.E.

V. McLoughlin.

G. R. Smith, M.A.

G. Mackenzie

M. J. Doyle.

B. E. Fee.

J. C. Slater.

J. F. Lawless.

J. Roche.

J. Campbell, M.A.

J. J. Hughes.

N. Fitzharris.

J. Lenihan.

C. Enright.

G. Aungier.

R. Tynan.

E. J. Kennedy.

R. Bryan.

A. J. Ward.

J. Dooley.

T. J. Ryan.

P. O Riain.

COURSES AND TIME TABLES

BOLTON STREET

No. of Course	Subject	Day	Hour	Room	Teacher	No. of Syllabus
	INTRODUCTORY.					
1B	Arithmetic	Wed.	7.30–8.30	C 2	W. J. O'Brien	2
	English	Wed.	8.30–9.35	C 2	W. J. O'Brien	1
	Practical Drawing	Tu., Fri.	7.30–9.30	C 2	B. E. Fee	3
	Practical Drawing (Metal Plate Work).	Tues.	7.30–9.30	D 2	J. Dooley	35
	MECHANICAL ENGINEERING COURSE.					
	FIRST YEAR :					
3B	Machine Drawing—I.A *or*	Mon.	7.30–9.30	A 5	J. C. Slater	4
	Machine Drawing—I.B.	Wed.	7.30–9.30	A 5	B. E. Fee, J. F. Lawless	4
	Geometry	Thurs.	7.30–9.30	B 27	R. J. Dowling	9
	Mathematics 1.	Fri.	7.30–9.30	B 18	J. J. Hughes	11
	SECOND YEAR :					
4B	Machine Drawing—II.	Thurs.	7.30–9.30	A 5	B. E. Fee, J. F. Lawless	5
	Engineering Science—I.A.	Tues.	7.30–9.30	C 8	R. J. Dowling	16A
	Mathematics II.	Wed.	7.30–9.30	C 22	J. Campbell	12
	THIRD YEAR :					
5B	Machine Construction—III.	Tues	7.30–930	A 5	W. J. O'Brien, J. Roche	6
	Applied Mechanics—II.	Thurs.	7.30–9.30	C 8	A. M. MacLoughlin	17
	Mathematics III.	Wed.	7.30–9.30	C 7	H. C. Clifton	13
	FOURTH YEAR :					
6B	Machine Construction—IV	Tues.	7.30–9.30	A 5	W. J. O'Brien	7
	Applied Mechanics—III.	Wed.	7.30–9.30	C 8	A. M. MacLoughlin	18
	Heat Engines—II.	Fri.	7.30–9.30	A 8	R. J. Dowling	20
	Mathematics—IV	Mon.	7.30–9.30	C 7	H. C. Clifton	14
	FIFTH YEAR :					
7B	Machine Design—V.	Tues.	7.30–10.0	B 27	B. J. Dixon	8
	Applied Mechanics—IV.	Wed.	7.30–9.30	C 8	A. M. MacLoughlin	19
	Heat Engines—III.	Thurs.	7.30–9.30	A 8	P. Cormack	21
	Mathematics—V.	Mon.	7.30–9.30	C 7	H. C. Clifton	15
	MECHANICAL ENGINEERING TRADES COURSES—ENGINEERING WORKSHOP PRACTICE.					
	FIRST YEAR :					
10B	Engineering Workshop—I.	Tu., Th.	7.30–9.30	D 7	G. Aungier, R. Tynan	22
	Machine Drawing—I.A. *or*	Mon.	7.30–9.30	A 5	J. C. Slater	4
	Machine Drawing—I.B.	Wed.	7.30–9.30	A 5	B. E. Fee, J. F. Lawless	4
	Engineering Science—I.B.	Fri.	7.30–9.30	C 8	W. J. O'Brien	16B
	SECOND YEAR :					
11B	Engineering Workshop—II.	Mon.	7.30–9.30	D 7	G. Aungier, R. Tynan	23
	Machine Drawing—II.	Thurs.	7.30–9.30	A 5	B. E. Fee	5
	Mathematics—I.	Fri.	7.30–9.30	C 22	J. J. Hughes	11
	THIRD YEAR :					
12B	Engineering Workshop—III	Fri.	7.30–9.30	D 7	G. Aungier, R. Bent	24
	Applied Mechanics—II. *or*	Thurs.	7.30–9.30	C 8	A. MacLoughlin	17
	Machine Construction—III	Tues.	7.30–9.30	A 5	W. J. O'Brien, J. Roche	6
	Mathematics II.	Wed.	7.30–9.30	C 22	J. Campbell	12

Number of Course	SUBJECT	Day	Hour	Room	TEACHER	Number of Syllabus
	FOURTH YEAR :					
13B	Engineering Workshop—IV.	Fri.	7.30–9.30	D. 7	G. Aungier, R. Bent	25
	Machine Construction—IV.	Tues.	7.30–9.30	A 5	W. J. O'Brien, J. Roche	6
	Mathematics III.	Wed.	7.30–9.30	C 7	H. C. Clifton	13

PATTERNMAKING.

	FIRST YEAR :					
14B	Patternmaking—I.	Mon.	7.30–9.30	D 4	E. J. Kennedy	26
	Workshop Drawing and Calculations.	Tues.	7.30–9.30	D 4	E. J. Kennedy	30
	SECOND YEAR :					
15B	Patternmaking—II.	Fri.	7.30–9.30	D 4	E. J. Kennedy	27
	Machine Drawing—IB.	Wed.	7.30–9.30	A 5	B. E. Fee, J. F. Lawless	4
	THIRD YEAR :					
16B	Patternmaking—III.	Fri.	7.30–9.30	D 4	E. J. Kennedy	28
	Machine Drawing—II.	Thurs.	7.30–9.30	A 5	B. E. Fee, J. F. Lawless	5

Students are recommended to add a suitable class in Mathematics.

FOUNDRY WORK.

17B	Ironmoulding	Wed.	7.30–9.30	D 4	....	29
	Workshop Drawing and Calculations.	Tues	7.30–9.30	D 4	E. J. Kennedy	30

BRASSFINISHING.

22B	Brassfinishing, Practical I	Wed.	7.30–9.30	D 5	——	31
	Engineering Science—IB	Fri.	7.30–9.30	C 8	W. J. O'Brien	16
	Machine Drawing—IA	Mon.	7.30–9.30	A 5	J. C Slater	4

BOILERMAKING.

26B	Boilermaking, Lectures and Drawing I.	Tues.	7.30–9.30	C 20	R. Bryan	33
	Boilermaking, Practical I	Wed.	7.30–9.30	D 9	R. Bryan	35
27B	Boilermaking, Lectures and Drawing II.	Thurs.	7.30–9.30	C 20	R. Bryan	34
	Boilermaking, Practical II	Mon.	7.30–9.30	D 9	R. Bryan	35

Students are recommended to add a suitable class in Mathematics.

SMITHWORK AND ART IRONWORK.

Number of Course	SUBJECT	Day	Hour	Room	TEACHER	Number of Syllabus
30B	Smithwork, Practical	Tues.	7.30–9.30	D 9	A. J. Ward	37
	Art Ironwork, Practical	Fri.	7.30–9.30	D 9	A. J. Ward	38
	Machine Drawing—IA ; *or*	Mon.	7.30–9.30	A 5	J. C. Slater	4
	Machine Drawing—IB	Wed.	7.30–9.30	A 5	B. E. Fee, J. F. Lawless	4

Students are recommended to add a class in Design.

METAL PLATE WORK.

	FIRST YEAR :					
38B	Metal Plate Work, Lecture and Drawing—I.	Tues.	7.30–9.30	C 5	J. Dooley	39
	Metal Plate Work, Practical, I	Thurs.	7.30–10.0	D 2	J. Dooley, T. J. Ryan	40
	SECOND YEAR :					
39B	Metal Plate work, Lecture and Drawing—II.	Mon.	7.30–9.30	C 5	J. Dooley	41
	Metal Plate Work, Practical, II.	Wed.	7.30–10.0	D 2	J. Dooley, T. J. Ryan	42
	THIRD YEAR :					
40B	Metal Plate Work, Lecture and Drawing—III.	Mon.	7.30–9.30	C 5	J. Dooley	41
	Metal Plate Work, Practical —III.	Wed.	7.30–10.0	D 2	J. Dooley, T. J. Ryan	42

Students are recommended to add a class in Design.

OXY-ACETYLENE WELDING.

41B	Oxy-Acetylene Welding Practical.	Tues., Fri.	7.30–9.30	D 2	T. J. Ryan	43

GAS FITTING.

The Course in Gas Fitting has been arranged in compliance with the requirements of the Institution of Gas Engineers for Students preparing for the Examinations prescribed by that Body.

	FIRST YEAR :					
42B	Lectures and Calculations —IA	Tues.	7.30–9.30	C 7	N. Fitzharris	44
	Lectures and Calculations —IB.	Thurs.	7.30–9.30	C 2	N. Fitzharris	44
	Gas Fitting, Practical—IA	Mon.	7.30–9.30	B 21	J. Lenihan, C. Enright	47
	Gas Fitting, Practical—IB	Wed.	7.30–9.30	B 21	J. Lenihan, C. Enright	47
	Machine Drawing—IC	Fri.	7.30–9.30	A 5	J. C. Slater	4
	SECOND YEAR :					
43B	Lectures & Calculations—II	Wed.	7.30–9.30	C 2	N. Fitzharris	45
	Gas Fitting, Practical—II	Fri.	8.0–10.0	B 21	J. Lenihan, C. Enright	48
	THIRD YEAR :					
44B	Lectures and Calculations —III.	Fri.	7.30–9.30	C 2	N. Fitzharris	46
	Gas Fitting, Practical—III.	Thurs.	8.0–10.0	B 21	J. Lenihan, C. Enright	49

MOTOR CAR ENGINEERING.

Number of Course	SUBJECT	Day	Hour	Room	TEACHER	Number of Syllabus
	INTRODUCTORY.					
45B	Motor Car Lecture	Mon.	7.30–9.30	B 15	G. R. Smith	50
	Practical Drawing *or*	Tues.	7.30–9.30	C 2	B. E. Fee	3
	Practical Drawing	Fri.	7.30–9.30	C 2	B. E. Fee	3
	Additional Subjects, Trade Students only.					
	Motor Car Workshop	Wed.	7.30–9.30	D 8	G. Mackenzie	55
	Engineering Workshop—I	Thurs.	7.30–9.30	D 7	G. Aungier, R. Tynan	22
	MOTOR CAR ENGINEERING COURSE.					
	FIRST YEAR :					
46B	Motor Car Engineering—I	Wed.	8.35–9.35	B 15	G. R. Smith	51
	Science & Mathematics—I	Tues.	7.30–9.30	A 8	J. J. Hughes	58
	Electricity—I ; *or*	Wed.	7.30–8.30	A 8	W. D. Horgan	60
	Motor Car Workshop—I ; *or*	Thurs.	7.30–9.30	D 8	G. Mackenzie....	55
	Engineering Workshop—I.	Thurs.	7·30–9.30	D 7	G. Aungier, R. Tynan	22
	SECOND YEAR :					
47B	Motor Car Engineering—II	Thurs.	7.30–9.30	B 15	V. McLoughlin	52
	Motor Car Electricity—II	Tues.	7.30–9.30	B 18	W. D. Pile	62
	Motor Car Mechanics—I	Wed.	7.30–8.30	B 27	J. J. Hughes	60
	Science—II	Wed.	8.35–9.35	A 8	W. D. Horgan	59
	Motor Car Workshop—II	Fri.	7.30–9.30	D 8	G. Mackenzie	56
48B	THIRD YEAR :					
	Motor Car Engineering—III	Mon.	7.30–9.30	A 8	V. McLoughlin	53
	Motor Car Electricity—III	Wed.	7.30–9.30	B 18	W. D. Pile	63
	Applied Mechanics—II *or*	Thurs.	7.30–9.30	C 8	A. McLoughlin	17
	Motor Car Workshop—III	Fri.	7.30–9.30	D 8	G. Mackenzie	57
	COURSE FOR MOTOR CAR DRIVERS.					
49B	Motor Car Engineering	Fri.	7.30–9.30	B 15	G. R. Smith	54

MOTOR CAR DRIVING.

For Particulars of this Afternoon Course—*see* Page 27.

WATCH AND CLOCK MAKING.

50B	Theory and Drawing	Thurs.	7.30–8.30	C 6	F. O'Kelly	64
	Practical Work	Thurs.	8.35–10.5	C 6	F. O'Kelly	64

IRISH.

	Irish	Thurs.	7.30–9.30	B 18	P. O Riain	66

LAND SURVEYING AND LEVELLING.

Commencing early in March, 1942, a short intensive Course will be held in Land Surveying and Levelling, comprising lectures and practical demonstrations in field work. (Syllabus No. 65.)

SYLLABUSES

SUBJECTS.

1.—English.

Grammar, parts of speech, punctuation. Reading exercises from technical publications, dictation, letter and essay writing, notetaking. Lectures on simple machines, workshop appliances and engineering materials.

2.—Workshop Arithmetic.

Signs and symbols, factors, greatest common measure, least common multiple, fractions, decimals. Percentages, ratio and proportion, units of length, the foot rule and its sub-divisions; area, volume, and weight. Simple mensuration.

3.—Practical Drawing.

Use of instruments, lettering, simple geometrical exercises, orthographic projection. Freehand sketches of models and machine parts. Scale drawings of nuts, bolts, screw threads, bearings, brackets, couplings and other simple machine details.

4.—Machine Drawing, I.

Use of drawing instruments and materials, precision exercises, orthographic projection. Use of sketch book, dimensionised freehand sketches of simple parts. Scale drawings of brackets, bearings, couplings, bolts, nuts, screws, simple engine details, valves and cocks. Explanation of features of importance in machine and engine parts, and of operations involved in their manufacture.

5.—Machine Drawing, II.

Screwed connections, cottered connections, pins, knuckle joints. Simple bearings. Pedestals, brackets, hangers, wall boxes. Couplings, keys. Pulleys and belt gearing. Steam and water pipes. Cylinders, pistons, piston rods, crossheads, cranks, eccentrics. Valves and cocks. Freehand sketches and scale drawings of simple machine parts and details. Dimensioning, lettering, etc.

6.—Machine Construction, III.

Various types of bearings, bearing metals and lubrication. Couplings, clutches, universal joints. Elements of toothed gearing. Belt gearing. Steam and internal-combustion engine details, valves, boiler mountings, pumps and hydraulic fittings. Elements of boiler construction. Machine tool details. Measuring instruments and limit gauges.

7.—Machine Construction and Design, IV.

Advanced exercises in Machine Drawing and Construction with problems involved in the design of the simpler details of machines and engines. The preparation of tracings for photograph prints and of finished drawings.

8.—Machine Design, V.

The application of mechanical science and of empirical knowledge to practical problems in mechanical engineering design. The properties and preparation of materials used and their employment with special regard to modern methods of economic production. The subjects will include : Boilers, cylinders to sustain internal pressure, valves and valve mechanisms, steam and internal combustion engine details, engine, dynamo and other important bearings, governors, pumps, tanks, cranes and winches, cams and link mechanisms, riveted and welded structures.

9.—Practical Geometry.

Use of instruments, simple geometrical constructions. Angles, degrees and radian measure, trigonometrical functions. Plain and diagonal scales. Problems on the circle. Construction of plane figures, properties of the triangle. Areas of rectilinear figures and of figures bounded by curves. The ellipse, cycloid and involute ; their application in engineering. Simple loci, link mechanisms. Orthographic projection, simple solids, sections, alteration of ground line, true shape. Simple developments and inter-penetrations.

10.—Practical Mathematics, I.

Arithmetic.—Simple and compound rules, calculations of prices and costs, fractions, decimals, contracted methods, percentages, ratio and proportion, square root. *Mensuration.*—Square, rect-

angle, triangle and circle, areas, volumes ; applications of geometry to problems. *Algebra.*—Symbols, the four simple rules, simple equations, evaluation and transformation of formulae, factors. Elementary graphs.

11.—Practical Mathematics, II.

Arithmetic.—Multiplication and division of decimals, square and cube root, ratio and variation. *Mensuration.*—Areas of plane figures, Simpson's rules, area and volume of cone, cylinder and sphere. *Algebra.*—Fractions and partial fractions ; simple, simultaneous and quadratic equations ; indices, logarithms, use of slide rule. The straight line and other simple graphs. *Trigonometry.*—Radian measurement, functions of angles, simple formulae, use of tables, solution of triangles, vectors. *General.*—Mass, weight, centre of gravity, work, power, velocity and acceleration.

12.—Practical Mathematics, III.

Simultaneous and quadratic equations, graphical solution of equations of degree higher than the second; maximum and minimum values of quadratic and cubic expressions, logarithmic solution of equations. Applications of Simpson's trapezoidal rules. Work done by a variable force or expanding gas. General solution of triangles, formulae for sine, cosine and tangent of sum or difference of two angles, formulae for sum or difference of sines or cosines of two angles ; application of the formulae for compound angles to problems on valve displacement, etc. Formulae for the functions of $\frac{1}{2}A$ and $2A$ in terms of A. Linear graph law and the reduction thereto of other laws, graphs of the form $y=ax^n$. Slope of a curve at a point and its interpretation, rate of increase, velocity and acceleration, area of a curve and its interpretation, area of $y=\sin^2 x$ and $y=\sin x$. The "root mean square" value of the ordinate.

13.—Practical Mathematics, IV.

Binominal expansions and approximations. Exponential and logarithmic theorems, calculations of logarithms to the exponential base and their transformation to a decimal or other base. Tabular study of the rate of increase and graphical study of the slope of curve of simple functions of a varying quantity, *i.e.* powers,

trigonometrical, logarithmic and exponential functions. Differentials of such simple functions ; of their sum, difference of product, and the function of a function. Successive differentiation and determination of the maximum and minimum values of a function. Integration as a process of summation, and as the inverse of differentiation. Simple harmonic motion.

14.—Practical Mathematics, V.

Definite integrals. Application of the calculus and of approximate methods to the determination of centres of gravity. Surfaces and volumes of solids. Guldinus' Theorems. Moments of inertia, bending moments and deflection of beams. Energy of a rotating mass, centre of pressure. Integration by partial fractions and integration by parts. Fourier series, harmonic analysis. Important differential equations, applications to beams and struts, to the pendulum, to simple and damped vibrations.

15.—Engineering Science, Ia.

Force.—Its effect and measurement. Simple stress, ultimate strength. Turning effect of a force, levers, principle of moments. *Speed.*—Linear and angular. Velocity ratio of wheel trains, belt and pulley gearing and simple lifting machines. Work, work diagrams, horse-power. Resultant force, equilibrium of three forces, triangle of forces. *Heat and Work.*—Temperature, quality of heat, mechanical equivalent of heat. Descriptive treatment of the simple steam engine and gas engine.

16.—Engineering Science, Ib.

British and metric units of measurements. Fractions, decimals, Simple mensuration applied to workshop problems. Measuring instruments, the foot rule, micrometer, vernier. Fits, limit and other gauges. Engineering materials, their production, properties and applications. Machine tools power, transmission toothed gearing ; wheel trains, belt and pulley gearing, screws. Force, work, power.

17.—Applied Mechanics, II.

Force measured by its straining action ; stretching of wires and springs. Stress, strain, elasticity. Moments of forces, couples,

centre of gravity. Work, energy ; diagrams of work, power, horse power, friction. Simple machines, velocity ratio and efficiency. Composition, resolution and equilibrium of forces. Velocity and acceleration. Elementary hydrostatics.

18.—Applied Mechanics, III.

Engineering materials, their manufacture, properties and testing. Elasticity, strain, energy, resilience. Co-planar forces, stresses in framed structures. Bending moment and shearing force ; moment of resistance of a beam. Strength of shafts. Friction on an incline, screw friction, mechanical efficiency. Linear and angular accelerations, their relations to mass, force and torque. Kinetic energy, fly-wheels, centrifugal force, governors. Simple, harmonic motion. Simple mechanisms.

19.—Applied Mechanics, IV.

Further treatment of testing of materials ; alloy steels, heat treatment, fatigue, principal stresses. Strength and deflection of beams, distribution of sheer stress. Strength and stiffness of shafts, combined bending and twisting. Flat and coiled springs, coil friction, struts. Crank effort diagrams, design of fly-wheels, balancing, governors.

20.—Heat Engines, II.

The steam engine cylinder, steam distribution, mean effective pressure, calculation of indicated, and of brake horse power. Problems on the simple slide valve. Work done per cubic foot of steam, superheating. Steam boilers ; types, heating surface, mechanical stokers, economisers, feed-water heaters, feed pumps and injectors, boiler efficiency. Fuels, calorific value, air supply per pound of fuel, products of combustion, transmission of heat from furnace to water, evaporation, air supply to furnace, natural and forced draught. Descriptive treatment of gas, oil and Diesel engines.

21.—Heat Engines, III.

Fuels.—Gas, oil and coal ; oil burners, stokers, pulverised fuel, Combustion ; calorific value of fuels, composition of flue gases. Boilers and auxiliaries ; condensers, treatment of feed water.

Laws of thermodynamics ; thermal efficiency, Carnot and Rankine cycles. Effect of compounding, superheating and feed-water preheating. *Reciprocating Engines.*—Steam, gas, oil, Diesel and petrol. Tests and adjustments for maximum economy and efficiency. *Steam Turbines.*—Modern types, principles of action. Layout of power stations. Air compressors ; refrigerators.

22.—Engineering Workshop, I.

Fitting.—Use of the hammer, chisel and file in preparation of flat surfaces. Making of templets and keys, cutting keyways. Use of compass, surface gauge and try-square in marking out work. Use of stocks and dies, and taps. Preparation of plane surfaces by use of scraper. *Turning and Machine Work.*—Simple exercises in turning of pins, bolts and spindles ; use of chucks and face-plates. Operations in drilling, shaping, planing and slotting machines. Forms, use and grinding of drills and cutting tools. Use of calipers, micrometer and gauges in working to precise dimensions. *Smithwork.*—Simple exercises in preparing, dressing and tempering chisels and other small tools.

All work will be done to drawings prepared in connection with the classes in Machine Construction and Design. Patterns and castings made in the School will be utilised as far as possible.

23.—Engineering Workshop, II.

Fitting.—Angle and bevel gauges, squares, calipers, clamps and other bench tools. Fitting and assembling of simple machine parts. *Lathe and Machine Work.*—Advanced exercises in screw-cutting ; turning of bushes, brasses, engine and machine parts. Operations in milling, planing, shaping, and drilling machines. Simple exercises in grinding to fine dimensions.

24.—Engineering Workshop, III.

Lathe Work.—Advanced exercises in turning, boring and screw-cutting involving the assembly of component and interchangeable parts. *Machine Work.*—Planing, milling and grinding operations on cylinders, pumps, connecting rods, links and various machine details. *Fitting.*—Assembly of engine and machine parts. Disassembly and reassembly of engine motion and of boiler mountings.

25.—Engineering Workshop, IV.

Advanced work on Syllabus of earlier years, involving the complete turning, machine, fitting and assembly of machine and engine details requiring a high degree of accuracy and finish; tool making. The application and use of modern high-grade measuring instruments and gauges. Fine grinding operations on hardened surfaces. Production of spur and ratchet wheels, tapered work, cottered connections, screw jacks and other workshop appliances.

26.—Patternmaking, I.

Selection, qualities and application of timbers and other materials used. Use of patternmaking tools and appliances, the contraction rule. Operation of wood-turning lathe. Construction of simple patterns of flanges, brackets, bearings, brasses and cocks. Corebox making; use of core prints.

27.—Patternmaking, II.

Patterns of more advanced type; built-up patterns, pedestals, wall brackets, hangers, toothed wheels, pulleys, clutches, pipe bends, valves, cocks, pistons. Use of strickles and loam board.

28.—Patternmaking, III.

Cylinders and connections for engines and pumps, hydraulic details. Patterns of complex nature, involving coring of passages, chambers and recesses. Patterns for ornamental castings in iron, brass and bronze.

29.—Iron Moulding.

Foundry sands, loam and graphite. Appliances, moulding boxes and tools. Characteristics, properties and grades of cast iron; chemical and other impurities. Arrangement and management of cupolas. Miscellaneous exercises in moulding and casting from patterns of a simple type. The preparation and use of cores; venting, the use of chills and strickles.

30.—Workshop Drawing and Calculations.

Orthographic projection. Simple exercises in drawing as applied to patternmaking and foundry work. Interpretation of prints and

drawings of castings. Elementary calculations required for foundry work.

31.—Brassfinishing, I.

Bench and lathe operations involved in the finishing and assembly of cocks, valves, lubricators, injectors and other gun-metal fittings. Preparation of simple switches and other electrical fittings. Ecclesiastical and other ornamental brasswork.

32.—Brassfinishing, II.

Advanced work on Syllabus of First Year dealing more particularly with screwing, chasing, knurling, spinning and other operations on the lathe. Brazing, polishing and lacquering.

33.—Boilermaking, Lectures and Drawing, I.

Elementary details of boiler construction, various types of riveted joints, boilermaking materials. Simple drawing and precision exercises, drawings of riveted seams, spacing of holes for flue tubes and stays.

34.—Boilermaking, Lectures and Drawing, II.

Advanced work on Syllabus of First Year dealing more particularly with boiler domes, manholes, coned shells and connections, gusset and other stays. Recent developments of boiler shop practice.

35.—Boilermaking, Practical, I.

Preparation of plates for boiler and tank construction. Marking and cutting out of templates and riveted joints. Boiler smithwork, treatment of angle and other sectional steel bars in the forge. Flanging of boiler end plates.

36.—Boilermaking, Practical, II.

Advanced work on Syllabus of First Year with special reference to oxy-acetylene processes in modern boiler shop practice.

37.—Smithwork.

Making up and care of fire, varieties and qualities of fuels, smiths' tools and appliances. Forging in wrought iron, mild steel and tool steel, welding, forging of pins, bolts, keys, hooks, cotters,

spanners, shackles, links, tongs, pincers, levers. Forging, dressing and tempering of chisels, centre punches and lathe tools. Thin flattened and pointed forgings.

38.—Art Ironwork.

Iron ; nature and properties, various kinds used by art ironworkers ; tools, their application and uses. Treatment and manipulation of wrought iron ; forging, welding, jumping, bending and embossing. Methods of joining ironwork, operations in art-smithing ; riveting, intersecting, slitting, tenoning, shrinking on collars, twisting scrolls and volutes.

39.—Metal Plate Work, Drawing and Theory, I.

Lectures.—Fuels used in metal plate work. Metals : characteristics and applications of tinplate, zinc, copper and iron. Solders and brazing materials. Galvanising, tinning and re-tinning processes. Calculations of dimensions, capacities and weights of vessels of various designs. *Drawing.*—Geometrical problems involved in metal plate work ; intersections and penetrations. Development of patterns for vessels and other objects of simple form such as : Cylindrical pipes and branches, coned articles in two or more pieces, equal tapering bodies, baking pans ; objects with combined flat and coned surfaces, bends in two or more pieces. T, V and Y pipes, finials, simple mouldings, gutters and other roofwork details. Principal joints used in metal plate work practice.

40.—Metal Plate Work, Practical, I.

Use of hand tools, cutting and bending appliances. Cutting, rolling, hammering, bending and flattening operations. Preparation of notches, allowances for lap, wiring and joining of seams and intersecting parts. Jointing, soldering, brazing, riveting and grooving. Annealing, stretching, raising and planishing. Tinning and re-tinning. Preparation of flue and ventilating pipes and branches, hoods, ventilators, T and Y pipes, household utensils, toilet ware, baking pans and cake tins.

41.—Metal Plate Work, Drawing and Theory, II, III.

The subjects listed for the the First Year will be dealt with in their advanced stages. The following will be the principal :—

Metals and alloys ; physical and chemical properties. Special uses of tinplate, galvanised and lead-coated iron. Fuels, solid and gaseous ; methods of application. Development of patterns of an advanced and complex type. Development of mouldings, and of patterns required for articles to be welded, brazed, and specially treated.

42.—Metal Plate Work, Practical, II, III.

In addition to advanced work on the Syllabus for the First Year, special attention will be given to the following : Oxy-acetylene processes applied to the cutting and welding of sheet-metal objects ; the choice and proper use of blowpipes, welding rods and fluxes ; sifbronze welding. Treatment of light panels, motor car wings, bonnets and radiators. Domes, finials, ships' ventilators. Lamps. vases, caskets and other ornamental work involving a high degree of finish. Flashings for domes, spires and special roof forms. Kettles, urns, boilerettes, mirrors and other domestic articles of importance.

43.—Oxy-Acetylene Welding.

Low pressure acetylene generator : precautions to be observed in the preparation and use of the gas. Storage and preservation of calcium carbide. Dissolved acetylene ; care of high pressure acetylene and oxygen cylinders, valves, gauges and other fittings. Choice and use of blow-pipes for various purposes. Practical exercises in cutting and welding plates, angle and other sectional bars. Welding of framed structures of different designs. Methods applied to cast iron, aluminium alloys, brasses, bronzes and copper. Use of welding rods and fluxes for different metals.

44.—Gas Fitting, Lectures and Calculations, I.

Gas fitting tools, design, use and maintenance. Gas piping ; pipe fitting materials and their applications. Joints, pointing materials, solders and fluxes. Gas threads. Meters ; description ; use and fixing. Gas burners, cookers, grillers, radiators, boilers and other familiar domestic appliances.

Simple calculations of areas and volumes ; cubic contents of tanks, vessels, apartments, etc. Meter reading ; units employed in gas measurements ; elementary treatment of pressure gauges and recorders.

45.—Gas Fitting, Lectures, II.

Blown, screwed and flanged joints; testing and precautions against accidents. Meters: types, connections, reading of indices. Gauges; burners for lighting, heating and cooking appliances; burner governors. Description and fixing of domestic cookers, grillers, gas fires, radiators, geysers, etc.

Physical properties of materials used for gas pipes and fittings; their reaction in stretching, compression, bending and twisting; effects of heat on materials.

Gauges; gauge pressures; pressure required for various gas appliances. Volumetric and pressure governors.

46.—Gas Fitting, Lectures, III.

Internal gas pipes and fittings: joints, pipe laying, lighting fittings; testing for soundness; detection and correction of faults. Relation between loss of pressure, bore and length of pipe and capacity; other circumstances affecting pressure. More advanced treatment of meters, governors and gauges. Illumination; lighting schemes; burners; shades; reflectors and chimneys. Domestic cookers and heaters; water heating; principles of hot water circulation; appliances and fittings; thermostats. Principles of ventilation. Physical effects of heat; temperature, British Thermal Unit. Precautions to be observed in working with gas; method of dealing with gassing.

47.—Gas Fitting, Practical, I.

Gas fitting tools, use, care and upkeep. Cutting and screwing iron, brass and copper tubing. Formation of parallel and taper screw threads; use of stocks, dies and taps. Drilling operations. Simple exercises in joint blowing, pipe fitting, bending and jointing.

48.—Gas Fitting, Practical, II.

More advanced work on the Syllabus of the First Year and, in addition—

Examination and practical study of L.P. lighting burners and lamps; ventilation arrangements; gas and air controls. Burners and castings of small cooking stoves, oven ventilation, spacing of hot plate burners; small gas circulators, burners, waterways and flues. Domestic gas irons; radiators; flueless heaters; thermostatic

control arrangements. Gas connections to lighting fittings, burners and gas fires. regulating devices. Pipe-work testing for soundness with gauge ; fixing of small type meters. The use of U tubes for ascertaining pressures.

49.—Gas Fitting, Practical, III.

Joint making in larger sized pipes ; saddle joints ; large screwed connections. Bending larger lead and iron pipes. Use of pressure gauge for locating stoppages. More advanced work on lighting fixtures, gas fires, radiators, cookers, geysers and hot water circulating arrangements, adjustment of thermostats. Practical study of recent improvements.

50.—Motor Car Lecture.—Introductory.

Simple descriptive lectures designed to familiarise students with note-taking and the expression of their ideas in writing. The lessons will be illustrated by cinematograph views and blackboard sketches and will include descriptive treatment of the following : Engine, clutch, gearbox, differential, back and front axles, steering and brake mechanisms, suspension system and chassis, indicating the names and functions of each part.

Simple calculations in length, area and volume relating to motor car problems.

51.—Motor Car Engineering, I.

Lectures illustrated by cinematograph films, lantern slides, sectioned models and motor car parts, descriptive of the construction of each unit of a modern car, explaining its duty and method of operation. The requirements and working conditions of each unit will be outlined with a discussion of the simple scientific principles involved.

52.—Motor Car Engineering, II.

Lectures illustrated by lantern slides, sketches and reference to models and motor car details, dealing in some detail with the principal features of importance of each unit. Special consideration will be given to the functions and operating conditions of major components, and the application of more advanced scientific principles will be illustrated and explained. The causes and effects of maladjustment and undue wear will be outlined with a brief

discussion of the methods of correction. Instruction in operation and maintenance and in the detection of simple faults will also be included.

53.—Motor Car Engineering, III.

Lectures dealing with more advanced types of automobile construction such as compression-ignition engines, hydraulic and centrifugal clutches, double-reduction rear axles, independent suspension and advanced braking mechanisms. The properties and combustion of fuels, carburation and carburettors, lubrication and lubricants, types and application of gears, the principal materials of construction and their application. Discussion of the efficiency of the petrol engine as a power producer, stresses imposed on its working parts, balancing, forces to be overcome by and stored in the car and those required and available for braking.

54.—Motor Car Engineering (Drivers).

Chassis arrangement. General description of the construction and operation of single- and multi-cylinder petrol engines, including the power, valve, fuel supply, carburettor, ignition, exhaust, cooling and lubricating systems. Simple treatment of the transmission system, including the clutch, gearbox, rear axle and differential. The arrangement, functions and care of springs, shock-absorbers, tyres, brake mechanism, front axle, steering gear and connections, wheels and hubs. Lubrication of the engine and chassis. Detection and correction of simple faults. Discussion of the essential elementary electrical principles of coil and magneto ignition and the construction and care of lead-acid batteries.

55.—Motor Car Workshop, I.

Simple fitting work involving the use of tools for measuring and marking out, cutting, filing, testing, bending, drilling, reaming, riveting, soldering, brazing, screwing and tapping. The care and repair of hand tools including annealing, dressing, hardening, tempering and grinding. Making simple hand tools. Elementary tube and pipe work in copper, and working sheet metal by hand methods.

56.—Motor Car Workshop, II.

Advanced work on Syllabus of First Year. Use of micrometer and other high-grade measuring instruments in garage work.

Preparation of tools and appliances for garage use. Simple exercises on motor car engine units.

57.—Motor Car Workshop, III.

General chassis dismantling; examination of components for repair; assembling and adjusting. Decarbonising, grinding valves and seatings, cylinder boring, fitting pistons and reseating valves. Trueing journals and crankpins, remetalling, boring and fitting bearings. Valve and ignition timing. Chassis frame and axle alignment, assembly and adjustment of transmission components, clutch and steering gear. Brake relining and adjustment. Fitting ball and roller bearings. Overhaul and testing of cooling and lubrication systems. Fitting and wiring electric equipment. Testing and locating faults in engine and electrical system. Use care and upkeep of modern garage equipment, appliances and tools.

58.—Science and Mathematics, I.

The lessons will comprise both lectures and practical work in the laboratory. The numerical problems arising in connection with the classes in Physics will be used as a basis for training in mathematical work. (*See* Syllabus No. 11.)

General Physics.—Length, mass, density. Principle of Archimedes. Pressure in liquids and gases. Boyle's law, pumps. *Heat.*—Expansion, temperature, thermometers, units of quantity. Change of state, melting and boiling points, vaporisation, condensation. Conduction, convection, radiation. *Chemistry.*—Chemical change, the meaning of combustion, oxides, the air, brief study of oxygen, nitrogen, hydrogen and sulphuric acid.

59.—Science, II. (Motor Car Engineering).

Heat.—Expansion of solids, liquids and gases, with arithmetical treatment. Calorimetry, specific and latent heats. Properties of vapours, diffusion of gases, kinetic theory of gases. *Chemistry.*—Molecules and atoms, elements and compounds, chemical symbols; atomic theory, atomic weights, quantitative notation, valency. Water, carbon, carbon dioxide, carbon monoxide, carbides. Combustion; ignition point; flame; the Bunsen burner. Hydrochloric acid, zinc chloride. Lead; oxide and sulphate; brief treatment of iron, aluminium, tin and zinc. The paraffin group.

60.—Mechanics, I. (Motor Car Engineering).

Use of vernier and micrometer. Computation of areas by mid-ordinate and other rules. Force, moments of forces, levers, wheel and axle, screw jack, wheel trains. Speed, mechanical advantage and efficiency of machines. Work, power, horse power, heat and power. Graphical representation of forces. Applications of mechanical principles to motor car problems.

61.—Motor Car Electricity, I.

Electrical pressure, current and resistance. Ohm's Law. Series and parallel circuits. Switches and switching devices. Electrical power. Primary and secondary cells. Magnetism and magnetic fields; the electro-magnet, electro-magnetic induction; simple treatment of the dynamo and induction coil. The car charging circuit.

62.—Motor Car Electricity, II.

Revision of magnetism, electro-magnetism and electro-magnetic induction. Elementary coil ignition; self-induction, condenser construction and action, multi-cylinder ignition, ignition timing, sparking plug construction and maintenance. Elementary generator; low-tension magneto construction and operation, high-tension rotating armature magneto. Simple voltaic cell, construction and operation of lead-acid battery, battery maintenance. Generator principles, the field, dynamo characteristics, cut-out, dynamo regulation by third brush, armature reaction and external regulators. Starter motor principles, starter characteristics, engine starting, starter drives.

63.—Motor Car Electricity, III.

More advanced and detailed treatment of the subject-matter of the Second Year of the Syllabus and in addition: Rotating magnet and polar inductor types of high-tension magneto, nickel-alkaline battery, compensated voltage control. Electrical instruments for service and testing, wiring systems and diagrams, ignition system testing; magneto testing, charging circuit, dynamo armature, field, cut-out and battery testing. Starter motor, starter switch and battery testing. Switchboard connections and testing; lamp faults, bulb failures and focussing, dipping reflector service, adjustment and repair.

64.—Watch and Clock Making.

Theory.—Measurement of time by astronomical means, mechanical and physical principles of horology. Materials employed in watch and clock making. Wheels and wheel trains, the balance spring, calculation of watch trains. Friction and lubrication. Main springs, keyless mechanisms, watch escapements. Clock weights, suspension, principles of action, pendulum, escapements. Electric clocks, systems of primary and secondary clocks.
Drawing.—Use of drawing instruments, drawing to scale, geometry of lever escapements, cycloidal curves, their application to wheel tooth profiles, etc.

Practical Work.—Tools used in watch and clock making. Filing and polishing processes, hardening, tempering, treatment of springs. Turning operations; balance staffs, pinions and pivots. Train wheel cutting and mounting. Balance, springing and adjusting. Repair work, disassembly, cleaning, various types of repairs and adjustment, testing and timing. Striking clocks, electric and other clocks and timepieces. Escapements, practice in deadbeat, gravity and other types of construction.

65.—Land Surveying and Levelling.

The Course is designed to give a sound theoretical and practical knowledge of Surveying, to develop facility in the use of the various instruments, in plotting surveys and in making finished plans. It will be found of service to students preparing for the examinations of the Institution of Civil Engineers. It also covers much of the work required for the various foreign examinations for Surveyors.

The Course will comprise twelve lectures with ten practical demonstrations in field work. The dates and places for the field work will be announced in class as the Course proceeds.

All apparatus and instruments for field work are supplied by the Schools, but students must provide their own plotting scales, survey book, level book, drawing instruments and materials.

An examination in theory and practice will be held at the close of the Course and certificates will be awarded to successful students.

Surveying with the Chain.—Equipment; ranging and measuring a line, simple surveys, arrangement of survey lines, triangulation,

booking the survey. Methods of dealing with surveys of average extent, various field operations and problems, traversing with the chain, setting out curves. Use of ordnance survey plans ; scales, conventional symbols. *Levelling.*—The dumpy and tilting levels, simple and compound levelling, booking and reducing of levels, checks datum, bench mark, sections, contours, permanent adjustments of the level. Use of the magnetic compass ; declination, bearings. *Surveying with the Theodolite.*—The vernier, measurement of horizontal angles, traversing, methods of plotting, co-ordinates, adjustment of closing error, adjustments of the instrument. *Calculation of Areas.*—Method of triangles, planimeter, computing scale.

66.—IRISH.

Conversational lessons on familiar everyday subjects, objects in the classroom and neighbourhood, the giving and carrying out of directions, etc. Study of *is* and *tá* and of simple verb forms. Salutations, phrases and idioms. Repetition and writing of rhymes, short stories and songs as an aid to memorising and pronunciation.

MOTOR CAR DRIVING

SPECIAL AFTERNOON COURSE.

Commencing in March, 1942, if circumstances permit, a limited series of lessons will be arranged on Saturday from 2.30 to 6 p.m., or on other suitable afternoons, in Motor Car Driving. The instruction will comprise :—

(*a*) Demonstration of the action of the controls ;
(*b*) Explanation of the rules, regulations, and conventions of road usage ;
(*c*) Practical preparation of the car for use ;
(*d*) Five hours' tuition in driving.

Admission to the lessons is reserved for students of seventeen years of age or upwards, who are not suffering from physical incapacity, and who have attended not less than 75 per cent. of the classes in Motor Car Construction and Operation of one of the Motor Car Engineering Day or Evening Courses. The formation of the classes will be duly notified to intending applicants for instruction.

Students are required to provide their own driving licences and must have them in their possession at each lesson.

Fee for Course—£2.

DAY APPRENTICE SCHOOL.

WATCHMAKING.

This Course is conducted under the terms of the Day Apprentice School Scheme. Scholarships comprise free training for two years in the Apprentice School with payment of 6s. weekly for the First Year and 8s. weekly for the Second Year.

Subjects and number of hours per week :—Practical Work and Drawing, 23 hours ; Mechanics, Science, Mathematics, Irish, English, 7 hours. Total—30 hours.

DAYTIME TECHNICAL COURSE

MECHANICAL AND MOTOR CAR ENGINEERING.

These Scholarship Courses are designed to furnish a sound practical and theoretical training to students who will subsequently enter the Motor Car or the General Engineering Trade as apprentices.

Entrance is confined to students of the Day Junior Technical School and will be decided on the results of an Entrance Examination, reports as to attendance, progress and conduct, and a personal interview as to physical fitness and general suitability.

The Scholarships entitle students to free instruction for a period of one year with the provision of such books and instruments as are necessary for class purposes.

Subjects and approximate number of hours per week : Workshops, Trade Lectures, Mechanics, Machine Drawing, Electricity, 21 hours ; Geometry, Science, Mathematics, Irish, English 9 hours. Total—30 hours.

DAYTIME TECHNICAL COURSES.

The Day Junior Technical School Course is designed to continue the general education of boys from the time when they normally leave a Primary School until they obtain employment at the age of about 16 to 17 years.

The curriculum includes Manual Instruction in Woodwork and Metalwork, Applied Science, Free and Practical Drawing and Practical Mathematics. The Course is thus particularly suitable as a pre-employment training for students who intend to follow trade or industrial occupations. It is a growing practice of employers to accept only boys who have received such training which, in certain instances, is made obligatory for entry into apprenticeship.

While suitable as a pre-apprenticeship training, the Course is not specialised towards a particular occupation. Care is taken to provide an education sufficiently extensive to ensure that the student will not be handicapped should he fail to become apprenticed to a trade, or should his tastes not incline in that direction.

The usual age for admission to the Course is from 14 to 15 years, and boys should have attained a standard of general education equivalent at least to the Sixth Standard of the Primary School programme. The Course, which is of two years duration, extends from the beginning of September to the end of June in each Session, and provides weekly instruction amounting to some twenty-six hours.

The Religious Instruction of the students is attended to by the local clergy. Special facilities are provided for Physical Training, organised games and social activities.

Fee for the Course, payable on enrolment, 20s per Session.

Students who through obtaining employment, or for other satisfactory reason, are unable to continue in attendance at the whole-time Day School Courses will be transferred to approved Evening Courses without further fee.