

1950

Architecture and Building: Prospectus for Day and Evening Classes 1950-51

City of Dublin Vocational Education Committee

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COISTE SAIRM-OIDEACAIS CATAIR BAILE ÁTA CLIAÍ

DEPARTMENT OF
**ARCHITECTURE
AND BUILDING**

TECHNICAL INSTITUTE
BOLTON STREET, DUBLIN

1950-51

PROSPECTUS
FOR DAY AND EVENING
CLASSES

1950—SEPT. 4 MONDAY

Wholetime Day Courses open for enrolment, Wholetime Day Apprentice Scholarship Courses resume work.

„ 11 MONDAY

Part-time Day Courses open for enrolment.

„ 18 MONDAY

Evening Courses open for enrolment. All other Day Courses commence work.

„ 25 MONDAY

Evening Courses commence work.

DEC. 20 WEDNESDAY

Final Class meetings before Christmas Vacation.

1951—JAN. 8 MONDAY

All classes resume work after Christmas Vacation.

MAR. 17 FRIDAY

St. Patrick's Day. School closed.

„ 20 TUESDAY

Final class meetings before Easter Vacation.

„ 28 WEDNESDAY

Evening classes resume work after Easter Vacation.

„ 31 SATURDAY

Fieldwork in connection with Evening Classes in Surveying and Levelling commences.

APR. 2 MONDAY

Day classes resume work after Easter Vacation.

MAY 4 FRIDAY

Final meetings of Evening Classes.

„ 14 MONDAY

Whit Monday. School closed.

JUNE 18 MONDAY

Sessional Examinations commence.

„ 28 THURSDAY

Summer Term closes.

Schools closed on all Bank Holidays not specified in above calendar

ΔΗ ΡΟΙΗΗ ΔΙΕΥΘΕΤΑ

ΔΞΥΣ ΡΟΙΡΞΗΙΟΕΤΑ

DEPARTMENT OF ARCHITECTURE AND BUILDING

Head of Department:

D. O'DWYER, B.Arch., M.R.I.A.I.
VICE-PRINCIPAL

Assistant Head of Department:

B. O'REILLY, B.Arch., A.R.I.B.A.

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CITY OF DUBLIN VOCATIONAL EDUCATION COMMITTEE

Rt. Hon. Councillor Cormac Breathnach, LL.D., T.D., Lord Mayor,
Mansion House, Dublin.

Very Rev. John Canon Fitzpatrick, D.D., Monte Coelio, Foxrock, Co.
Dublin.

Alderman Bernard Butler, B.A., T.D., 16 Healthfield Road, Terenure.

Alderman John McCann, T.D., P.C., 8 Fortfield Road, Terenure.

Alderman Martin O'Sullivan, T.D., P.C., "Kilmanaheen," Sutton Cross,
Sutton.

Councillor John Breen, 1 Arran Quay Terrace, Dublin.

Councillor P. J. Cahill, P.C., 64 Aungier Street, Dublin.

Councillor Michael O'Higgins, T.D., 11 St. Mary's Road, Ballsbridge.

Padraig T. Breathnach, Ph.D., M.A., F.C.P., 66 Iona Road, Glasnevin.

Mrs. M. Mulvey, P.C., Readsdales, Main Street, Dundrum.

Mr. Maurice F. O'Connell, B.A., H.Dip.Ed., 17 Oakley Road, Ranelagh.

Mr. Michael P. Rowan, 52 Capel Street, Dublin.

Mr. John Swift, Four Provinces House, Harcourt Street, Dublin.

Mr. Hilary Williams, 46 Lambay Road, Drumcondra.

Offices:—The Technical Institute, Bolton Street, Dublin.

MARTIN M. GLEESON, M.A., B.Comm., H.Dip.Ed.,
Chief Executive Officer.

CITY OF DUBLIN VOCATIONAL EDUCATION SUB-COMMITTEE (Technical Institute, Bolton Street)

Alderman Martin O'Sullivan, T.D., "Kilmanaheen," Sutton Cross,
Sutton.

Mr. Thomas D'Arcy, Irish National Painters' and Decorators' Union.

Mr. Gerard Doyle, Dublin Operative Plasterers' Trade Society.

Mr. Michael O'Reilly, Irish Engineering Industrial Union.

Mr. Robert Murphy, Master Jewellers' Association.

Mr. M. P. Rowan, 52 Capel Street, Dublin.

Mr. W. J. Whelan, Dublin Typographical Provident Society.

Mr. Hilary Williams, Ancient Guild of Incorporated Brick and Stone-
layers'.

Mr. G. E. Hetherington, Master Printers' Association.

Offices:—The Technical Institute, Bolton Street, Dublin.

MARTIN KEADY, B.E., B.Sc., A.R.C.Sc.I.,
Principal.

Telephone: 73553-4.

ADVISORY COMMITTEES

Architecture

J. P. ALCOCK, B.Arch., M.R.I.A.I.,
A.R.I.B.A.

W. HOWARD COOKE, PP.R.I.A.I.,
A.R.I.B.A.

A. H. HOPE, B.Arch., M.R.I.A.I.,
A.R.I.B.A.

F. B. MEEHAN, M.R.I.A.I.

H. S. ROBSON, M.Sc., B.Arch.,
M.R.I.A.I., A.R.I.B.A.

D. O'TOOLE, M.R.I.A.I.

Board of Architectural
Education of the Royal
Institute of the Architects
of Ireland.

Quantity and Building Surveying

J. A. KAVANAGH, F.S.I.

E. F. N. TAYLOR, F.S.I.

Royal Institution of
Chartered Surveyors
(Eire Branch).

Building Trades

E. THOMPSON

J. DOLAN

E. GIBNEY

M. CREEDON

J. PARSONS

G. MALCOLM

T. MALONE

Master Builders'
Association.

A. J. GALLAGHER

D. GLASGOW, M.I.H.V.E.

H. A. HALLETT

Association of Master
Plumbers, Heating and
Ventilating Engineers
of Ireland.

ADVISORY COMMITTEES (contd.)

Building Trades (contd.)

C. M. FORDE	}	National Association of Master Painters and Decorators of Ireland.
THOS. F. POWER		
ARTHUR C. SIBTHORPE		

FRANCIS O'CONNOR	}	Brick and Stonelayers' Society.
JOHN NEWELL		
PATRICK HOLOHAN		

A. DOYLE	}	Plumbers', Glaziers' and Domestic Engineers' Union.
EDWARD KANE		
C. CARRICK		

LEO CRAWFORD	}	Operative Plasterers' Trade Society.
GERALD DOYLE		
DONAL O'REILLY		

ROBERT F. MORGAN, National Amalgamated Society of Painters.

JOHN MULHALL, Irish National Painters' Union.

L. HUDSON, United House and Ship Painters' Union.

TECHNICAL INSTITUTE, BOLTON STREET

Principal:

MARTIN KEADY, B.E., B.SC., A.R.C.S.C.I.

Vice-Principal:

DONAL O'DWYER, B.ARCH., M.R.I.A.I.

DEPARTMENT OF MECHANICAL ENGINEERING

Head of Department:

THE PRINCIPAL

Assistant Head of Department:

JOHN D. BARRY, M.SC., B.E., A.M.I.MECH.E., A.M.I.A.E.

Head of Motor Car Engineering Division:

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

Chief Instructor (Mechanical Engineering Trades):

H. FITZGERALD

DEPARTMENT OF ARCHITECTURE AND BUILDING

Head of Department:

THE VICE-PRINCIPAL

Assistant Head of Department:

B. O'REILLY, B.ARCH., A.R.I.B.A.

Chief Instructor (Building Trades):

R. GRIMES, A.B.I.C.C., FULL TECH. C. & G.

DEPARTMENT OF PRINTING AND BOOK PRODUCTION

Head of Department:

W. J. FITZPATRICK, FULL TECH. C. & G.

SCIENCE DIVISION

Head of Division:

J. NUNAN, B.SC., H.DIP.ED.

DAY JUNIOR TECHNICAL SCHOOL

Teacher-in-Charge:

L. MAC AMHLAOIBH, B.A.

Stock-taker:

W. J. N. O'BRIEN, DIPL. ING.

Clerk:

TOMAS O SOMACHAIN.

DEPARTMENT OF ARCHITECTURE AND BUILDING

TEACHING STAFF

1. Architectural Design:

D. F. O'DWYER, B.ARCH.,
M.R.I.A.I.
B. O'REILLY, B.ARCH., A.R.I.B.A.
A. BRADY, B.ARCH.

2. Building Construction, Specifications and Materials:

D. F. O'DWYER, B.ARCH.,
M.R.I.A.I.
A. E. WILLIAMS, M.R.I.A.I.
A.M.I.S.E.
B. O'REILLY, B.ARCH., A.R.I.B.A.
J. O'NEILL, B.ARCH., M.R.I.A.I.
A. BRIOSCU, B.ARCH., M.R.I.A.I.
P. TUIE, B.ARCH.

3. History of Architecture:

B. O'REILLY, B.ARCH., A.R.I.B.A.

4. Structural Engineering, Surveying:

E. P. DUNNE, A.M.I.MECH.E.,
A.M.I.C.E.I.
W. J. O'BRIEN, DIPL.ING.
M. NIALL, M.SC., B.COMM.

6. Quantities:

M. J. BURKE, M.S.A., F.S.I.
L.R.I.B.A.
H. DARKER, P.A.S.I.

7. Mathematics and Science:

G. LATCHFORD, B.E., B.SC.
E. P. DUNNE, A.M.I.MECH.E.,
A.M.I.C.E.I.
S. H. KNIGHT, B.A.
J. NUNAN, B.SC., H.DIP.ED.
W. J. O'BRIEN, DIPL.ING.
W. O'DOHERTY, B.A., H.DIP.ED.
M. NIALL, M.SC., B.COMM.
W. HICKSON, M.A., M.SC., H.DIP.ED.
S. O'TUAMA, B.SC.
S. ROSSITER.

8. Geometry and Drawing:

A. BRADY, B.ARCH.
J. CUNNINGHAM, A.B.I.C.C., FULL
TECH. C. & G.
R. GRIMES, A.B.I.C.C., FULL TECH.
C. & G.
J. HANNAN
M. NOLAN.
M. MCGOLDRICK

9. Commercial and Legal Subjects:

H. McDEVITT, Barrister-at-Law
G. WALSH, B.COMM., A.C.C.A.,
F.COM.SCA.

TEACHING STAFF (contd.)

10. Languages:

L. MACAMHLAIBH, B.A. (HONS.)
M. MOORE
M. O MAINNIN

11. Physical Training:

M. DOOGAN

12. Trade:

Bricklaying—

E. BYRNE
A. WILLIAMS
D. COX
J. THORNBERRY

Cabinetmaking—

M. MURRAY
C. COSTELLO

Carpentry and Joinery—

T. BRIDGEMAN, A.B.I.C.C.
J. O'BYRNE
R. GRIMES, A.B.I.C.C., FULL
TECH. C. & G.
J. CUNNINGHAM, A.B.I.C.C.,
FULL TECH. C. & G.
M. NOLAN
M. MCGOLDRICK
N. FAGAN
D. MOLUMBY

Coachbuilding—

H. DEMPSEY
P. O'REILLY

Coachpainting—

R. McNAMARA
P. McKENNA

Coachtrimming—S. McCONAILL

Painting and Decorating—

C. O'BYRNE, F.I.B.D. (INC.).
P. GORDON
J. KENNY

Plastering—

L. COMERFORD
J. SAUNDERS

Plumbing—

J. BOLTON, FULL TECH. C. & G.
D. ROONEY
D. McGRATH
J. DARBY

Woodcutting Machinery—

J. WALL
J. KEOGH

Metalwork—O. CROTTY

GENERAL REGULATIONS FOR THE SCHOOLS AND CLASSES OPERATING UNDER THE AUTHORITY OF THE COMMITTEE

1. ADMISSION AND ENROLMENT.

(a) In general, applicants for admission to the Classes and Courses must be not less than 14 years of age, but admission to a whole-time Day Course may be granted where the applicant is over 13 years of age and has been enrolled for at least one year in the Sixth Standard of a Primary School. This Regulation does not apply to the School of Music or Colaiste Muire, Cathal Brugha Street.

(b) The Committee, in accordance with the means and facilities at its disposal, has provided classes for the sole purpose of supplementing the practical trade training of persons actually employed at and engaged in the various operations of the trade and whose employment as such is accepted by the recognised Unions of the trades concerned.

(c) In determining whether an applicant for admission to one of these practical trade classes complies with the above conditions the Committee is guided, where necessary, by the evidence supplied by the Masters' Associations and the official Trade Unions of the trade concerned.

(d) Admission to a particular class or course is subject to the published regulations relative to that class or course.

(e) One month after the opening date of classes or courses students will be permitted to enrol only with the special permission of the School Authority.

(f) Pupils in attendance at Primary and Secondary Schools are not eligible for enrolment except by special permission of the School Authority.

(g) The educational fitness of a student to enrol in a particular course may be decided by an examination or other means considered necessary.

(h) A student is not entitled to enrol in a class or course which the School Authority decides is too advanced for his/her standard of knowledge.

(i) Enrolment procedure :—

(i) Intending students must enter on the Enrolment Form supplied all the information required by the School Authority.

(ii) The classes or courses to be taken are decided in interview with a member of the School Staff.

(iii) The appropriate fee is then paid to an officer of the Committee and a receipt issued therefor. A student who pays a fee must insist that he receives an official receipt for the amount of the fee paid.

(iv) The appropriate class ticket/tickets is then issued to the student.

(j) (i) No student may attend a class until he/she has received a class ticket.

(ii) On first attendance at each class the student must tender to the teacher in charge his/her appropriate class ticket, together with the receipt for fee paid.

(k) Students will be enrolled during the period and at the times stated in the Committee's publications.

(l) The School Authority is authorised to refuse an enrolment, pending a decision thereon by the Committee.

2. FEES.

(a) The fees payable for the several classes and courses included in the Scheme of Instruction are stated in the publications of the Committee, and must be paid in full on enrolment unless otherwise stated.

(b) Where a course includes subjects of different stages, the total fee will be computed on the basis that the initial fee is that of the highest stage.

(c) For enrolments in subjects ancillary to the original enrolment, in the same or another School or Department, the additional fee will be computed on the basis that all the classes have been selected on first enrolment. Where the additional subjects are deemed not to be ancillary, the fee payable will be as for a separate enrolment.

(d) The School Authority is authorised to decide if the additional enrolment is ancillary to the original enrolment.

(e) For fee purposes, Irish and/or Physical Training will be regarded as additional subjects to any class or course.

(f) Fees will not be refunded except where a class does not form.

(g) Cheques should be crossed and made payable to the City of Dublin Vocational Education Committee.

3. TRANSFERS.

An enrolment is not transferable from one student to another. Transfers from one Class to another; from one school to another; from Day Classes to Evening Classes; or from Evening Classes to Day Classes, with allowance for the fees paid, will be permitted only for a satisfactory reason and by special permission of the School Authority.

4. PRODUCTION OF ORIGINAL RECEIPT.

Where applications are made for additional enrolments, or for transfers, the original receipt must be produced.

5. FORMATION AND CONTINUANCE OF CLASSES.

The Committee reserves the right at any time to add or delete Classes or Courses to or from its Scheme of Instruction; to extend the period of a Class; and to close a Class, or to alter the day or times of a Class Meeting.

6. DISCIPLINE.

The School Authority may suspend any student for breach of rules and regulations; absence from Classes; irregular or unpunctual attendance; disorderly conduct in the School or within the School precincts; disobedience to a member of the staff; or for any other reason deemed sufficient. The Committee reserves the right to confirm such suspension and to cancel the enrolment without refund of fee. Where immediate action is required because of indiscipline on the part of the students, any member of the School Staff has authority to take appropriate measures, pending report to the School Authority.

7. SMOKING.

Smoking is not permitted in the Schools.

8. INJURY TO STUDENTS.

The Committee does not accept responsibility for injury to students resulting from careless conduct or neglect or disregard of regulations.

9. STUDENT PROPERTY

The Committee does not accept any responsibility for loss or damage to any student property—bicycles, hats, coats, books, etc.

10. SCHOOL PROPERTY.

Where School property is damaged wilfully or through careless conduct on the part of students, such students (or their parents or guardians) may be required, on the order of the Committee, to pay for such repairs or replacements as may be necessary.

11. CHANGE OF ADDRESS.

Students should notify the School Authority of any change of address.

12. BOOKS, STATIONERY, EQUIPMENT, DRESS.

Students are expected to provide themselves with such books, stationery, equipment, and dress as may be required.

13. INFECTIOUS AND NOTIFIABLE DISEASES.

The head of the household must inform the School Authority immediately of any infectious or notifiable disease which may occur in the house in which a student is residing. Such a student must not resume attendance until permitted to do so by a medical officer.

14. EXAMINATIONS.

Permission to sit for Scholarship, Sessional, or other examinations held under the authority of the Committee, will be governed by the conditions relevant to the examinations.

15. SCHOOL AUTHORITY.

The term "School Authority," as used in these Regulations, indicates the Chief Executive Officer, or an officer delegated to act on his behalf.

The above Regulations have been adopted by Resolution of the Vocational Education Committee for the City of Dublin and approved by the Minister for Education.

CONDITIONS REGULATING THE ADMISSION OF STUDENTS TO CLASSES AND COURSES

Whole-time Day Apprentice Scholarship Courses in Plumbing, Painting and Decorating, Bricklaying

These Courses are organised in close association with the Masters' Associations and the various official Trade Unions concerned. As these bodies accept responsibility for the placing of the boys in employment and as the numbers to be admitted to each year of the Courses must be related to the number of vacancies for employment which are likely to occur in the trades, the Scholarship holders will be selected by examination and interview from boys nominated by the Masters' and Trades' Unions concerned, in accordance with the regulations drawn up from time to time by the various Advisory Committees and approved by the Vocational Education Committee.

Practical Workshop Classes in Trade Subjects

These classes are provided for the sole purpose of supplementing the practical trade training of persons actually employed at and engaged in the various operations of the trade. The Committee realise that it is impossible for a person to learn a trade solely by attendance at these classes, and are further of the opinion that the admission to the classes of persons not actually engaged in the trades would be, not only of little use to such persons, but would prejudicially affect the instruction of those for whom the classes have been organised. Accordingly, the Committee reserve the right to restrict enrolment in the trade practical classes to those persons who are actually employed in the several processes and operations of the trade.

The classes in the Department of Architecture and Building to which this regulation refers in the Session 1950-51 will be the Evening Trade Classes in :

Bricklaying; Carpentry and Joinery; Plumbing; Plastering; Painting and Decorating; Cabinetmaking; Woodcutting Machinists' Work; Coachbuilding; Coachpainting; Coachtrimming.

And the Part-time Day Apprentice Workshop Classes in :

Cabinetmaking; Carpentry and Joinery; Plumbing; Painting and Decorating.

For admission to the trade classes as named, proof of actual employment in the several processes and operations of the trade will be certificates to that effect from the Masters' Associations and/or the official Trades Unions of the trade concerned.

Day and Evening Technological Courses—Architecture, Quantity and Building Surveying, Civil Engineering and Building Technology

Only such students will be admitted as have attained a standard of general education that will enable them to follow all the subjects of the Course with profit. In the absence of satisfactory evidence on this point, intending students may be required to pass a qualifying examination as a condition of admission.

The above Regulations have been adopted by Resolution of the Vocational Education Committee for the City of Dublin and approved by the Minister for Education.

GENERAL DESCRIPTION OF THE ACTIVITIES OF THE DEPARTMENT

DAY ACTIVITIES

The Day activities comprise :

- (a) Technological Courses in :
Architecture; Quantity and Building Surveying.
- (b) Whole-time Apprentice Scholarship Courses in :
Bricklaying; Plumbing; Painting and Decorating.
(These are described in detail in a separate Prospectus)
- (c) Part-time Apprentice Courses in :
Carpentry and Joinery; Plumbing; Painting and Decorating; Woodcutting Machinists' Work; Coachbuilding; Coachpainting; Cabinetmaking.

EVENING ACTIVITIES

The Evening activities comprise :

- (a) Technological Courses in :
Architecture; Civil Engineering; Quantity Surveying; Building Technology; Land Surveying and Levelling.
- (b) Trade Courses in :
Bricklaying; Carpentry and Joinery; Plumbing; Plastering; Painting and Decorating; Cabinetmaking; Woodcutting Machinery; Coachbuilding; Coachpainting; Coachtrimming.

DESCRIPTION OF COURSES

1. TECHNOLOGICAL COURSES

The Whole-time Course in Architecture is a 3-years' day course designed to bring students to the standard of the Intermediate Examination of the Royal Institute of the Architects of Ireland. Satisfactory completion of the course and success in the third year examination carries exemption from the Intermediate Examination of the Institute. It is necessary that students taking the course shall have passed the Preliminary Examination of that Institute or one of the examinations (*e.g.*, Secondary Leaving Certificate or Matriculation) that confer exemption therefrom. On completion of this course, students are recommended to obtain employment in an architect's office and to continue for a further two years in the Part-time Course (see below) in preparation for the Final Examination.

The Part-time Course in Architecture is a 5-years' part-time day and evening course for students in Architects' offices designed to prepare them for the Intermediate and Final Examinations of the Royal Institute of the Architects of Ireland. It is assumed that students taking this course will have passed the Preliminary Examination of that Institute or one of the examinations carrying exemption therefrom. This course involves part-time day attendance, in addition to evening classes (see Time Tables).

Alternative evening classes in Design are provided for students who are unable to attend afternoon classes.

The Whole-time Course in Quantity and Building Surveying is a 2½-years' day course designed to prepare students for the First and Intermediate Examinations of the Royal Institution of Chartered Surveyors (Eire Branch, Building and Quantities sub-division). It is assumed that students taking the course will have passed the Preliminary Examination of that Institution or one of the examinations that confer exemption therefrom. The Royal Institution of Chartered Surveyors accepts this course as a training

qualification, rendering a student eligible to sit for the First and Intermediate Examination. Before sitting for his Final Examinations he must spend an approved period in a Surveyor's office and during this period he may follow the evening courses.

The Part-time Course in Quantity and Building Surveying is a 2½ years' part-time day and evening course for students in Surveyor's offices. It is similar in aim to the whole-time course, described above. On completion of this course, the student may transfer to the evening course in preparation for the Final Examination of the Institution.

The Evening Course in Quantity and Building Surveying is a 3-years' evening course (fourth, fifth and sixth years) in preparation for the Final Examination of the Chartered Surveyors' Institution, and is suited to students who have completed one of the courses described above.

The Evening Course in Civil Engineering is a 4-years' evening course designed for students who are employed in Engineering offices, to prepare them for the Associate-Membership Examination of the Institution of Civil Engineers of Ireland. A certificate of successful completion of this course is accepted by the Institution as evidence of technical education which is a pre-requisite for admission to that Examination. Before admission, a candidate must also satisfy the Institution as to his practical training in Engineering.

The Evening Courses in Building Technology are 5-years' evening courses designed for students who are employed in a technical capacity in the building industry and leading to the Certificate Examinations of the Department of Education. Certificates are awarded in the Elementary, Intermediate and Advanced Stages to candidates who obtain passes in the following subjects:

ELEMENTARY STAGE : (i) Building Construction *and*
(ii) Mathematics and Geometry.

INTERMEDIATE AND ADVANCED STAGES :

- (i) Building Construction ;
- (ii) Structural Engineering *or*
Builders' Quantities *or*
Plane and Solid Geometry.

The Evening Course in Land Surveying and Levelling is suitable for assistants and students in Architects', Engineers' surveyors', Builders' and Insurance offices. It comprises lectures and field work. The latter are held on Saturday afternoons during late spring and early summer.

2. TRADE COURSES

These courses are designed for apprentices and young journeymen engaged in the several trades. Every facility is given to students who wish to enter for the Trade Certificate Examinations of the Department of Education or of the City and Guilds of London Institute (see pages 21 & 22), these examinations being conducted in the School at the close of the evening session.

EVENING COURSES leading to the Department of Education Examinations are provided in the following trades :

Bricklaying, Carpentry and Joinery, Plumbing, Plastering, Painting and Decorating, Cabinetmaking, Woodcutting Machinery.

Evening Courses are also provided in the following trades :

Coach and Motor Body Building, Coach painting, Coach trimming.

PART-TIME DAY COURSES. Apprentices to certain trades are allowed time off to attend these courses of afternoon lectures and practical work. Courses are provided in the following trades :

Carpentry and Joinery, Painting and Decorating, Cabinetmaking, Plumbing.

PART-TIME DAY AND EVENING COURSES are provided in the following trades :

Woodcutting Machinists' Work, Coach and Motor Body Building, Coachpainting.

Similar part-time courses will be inaugurated in other trades in which the requisite conditions can be procured.

Whole-time Day Apprentice Scholarship Courses in Bricklaying, Plumbing, and Painting and Decorating are separately described in another Prospectus.

3. PHYSICAL TRAINING

Evening Classes in Physical Training are provided for students.

EXAMINATIONS

The Courses are designed to prepare students for the following examinations :

1. Department of Education Examinations

- (a) Technological Certificate Examinations in Building.
- (b) Trade Certificate Examinations in :

Brickwork ; Carpentry and Joinery ; Plumbers' Work ;
Plasterers' Work ; Painters' and Decorators' Work ;
Cabinetmaking ; Woodcutting Machinists' Work.

2. Examinations of Professional Institutes

The Royal Institute of the Architects of Ireland.

The Royal Institution of Chartered Surveyors (Eire Branch).

The Institution of Civil Engineers of Ireland.

3. City and Guilds of London Institute

SCHOLARSHIPS AND PRIZES

The City of Dublin Vocational Education Committee offer the following scholarships annually :

Day Apprentice Scholarships, entitling the holders to free training for two years in the Whole-time Day Apprentice Scholarship Courses, together with a payment of twelve shillings per week during the first year and sixteen shillings per week during the second year of the Courses. On the conclusion of the Courses, students are accepted as third-year apprentices to the trades. The scholarships are awarded to candidates between the ages of 14 and 16 years who have passed a qualifying examination of Primary Leaving Certificate standard and who have been selected on the result of an interview by a board, consisting of representatives of the School and of the Employers' and Operatives' Associations of the trades concerned. Examinations and interviews are generally conducted in the month of March.

The Dublin Mechanics' Institute Scholarships are provided for by the Dublin Mechanics' Institute Residuary Fund. One scholarship is awarded annually in the Building Trades Groups to apprentices between the ages of 16 and 19 years who have been in attendance at a Technical Course during the previous session and made a specified minimum attendance. The Scholarships are tenable for three years and are valued about £3 each per year.

The Department of Education offers the following medals and prizes annually in connection with their examinations :

- (a) **Technological Certificate Examinations.** A prize of £1 in each subject of the Elementary and Intermediate Stages. A silver medal, a first prize of £2 and a second prize of £1 in each subject of the Advanced Stage.
- (b) **Trade Certificate Examinations.** A prize of £1 in each of the practical and written examinations of the Junior Stage. A bronze medal and a prize of £2 in each of the practical, and a prize of £1 in each of the written, examinations of the Senior Stage.

The William Rooney Memorial Prizes are provided for by a trust fund, established in memory of William Rooney (Fear na Muinntir), the Irish poet and patriot. A sum of approximately £12 is available annually for awards to students who are apprentices to the Mechanical Engineering and Building trades. The award alternates in successive years between students of the Engineering and Building trade groups, but is not available to holders of scholarships in the Day Apprentice Courses. A competent knowledge of Irish is an essential requirement, in addition to regular attendance and proficiency.

Brick and Stonelayers' Union Prizes. A sum of £5 is provided annually for award as prizes to students of the Brickwork Courses. The Union conducts the examination.

Carpentry and Joinery Prize. A sum of £5 annually is anonymously contributed for award as prizes to students of the Carpentry and Joinery Courses.

Master Painters' Association Prize. A sum of £3 3s. 0d. is provided annually for award as prizes to students of the Painting and Decorating Courses.

Painters' Unions Prize. A sum of £3 3s. 0d. is provided annually for award as prizes to students of the Painting and Decorating Courses.

Gypsum and Bricks Prize. An annual contribution of £50 is made by Gypsum and Bricks, Ltd., for award as prizes to students of the Plastering Courses.

Master Plasterers' Association Prize. A sum of £5 is provided annually for award as prizes to students of the Plastering Courses.

Operative Plasterers' Trade Society Prize. A sum of £5 is provided annually for award as prizes to students of the Plastering Courses.

Royal Institute of the Architects of Ireland Prize. A sum of £5 5s. 0d. is provided for award as prizes to students of the Architectural Courses.

FEES

Course	Fee per Session		
	£	s.	d.
1. TECHNOLOGICAL COURSES :			
Architecture (Whole-time)	7	7	0
Architecture (Part-time)	2	0	0
Quantity and Building Surveying (Whole-time)	7	7	0
Quantity and Building Surveying (Part-time)	2	0	0
2. PART-TIME DAY APPRENTICE COURSES	1	0	0
3. EVENING COURSES AND CLASSES :			
All Courses or Single Subjects	0	10	0
Additional Subjects	0	3	0

EQUIPMENT

The equipment of the School can be briefly described under seven heads: (1) Laboratories, (2) Drawing Offices and Art Room, (3) Workshops, (4) Classrooms and Lecture Rooms, (5) Gymnasium, (6) Surveying and Levelling Equipment, (7) Models and Specimens, (8) Visual Aids.

Laboratories

The Laboratories, covering a floor area of 7,500 sq. feet, are:

- (a) AN ELEMENTARY PHYSICS AND CHEMISTRY LABORATORY with Preparation Rooms and Stores equipped with the usual apparatus required for preliminary courses in General Science.

- (b) A MECHANICS AND MATERIALS TESTING LABORATORY well equipped with apparatus for demonstrating the laws of statics and dynamics and with machines for testing engineering and building materials in compression, tension, shear, bending and torsion, and for measuring deflections and extensions under load. The equipment includes an Avery vertical single-lever testing machine capable of applying tension or compression up to 5 tons; a vertical-screw testing machine for deflection and cross-breaking tests; a torsion testing machine; a cement testing machine of the compound lever type; a beam testing apparatus; a Searle extensometer and several wire extensometers and compression and tension testing machines for springs; strut apparatus fatigue testing machine; various apparatus for determining moduli of elasticity.
- (c) A HEAT LABORATORY with equipment for experimental work on Heat and Heat Engines, including Jünker and Bomb Calorimeters, flashpoint and viscosity apparatus, pyrometer (Whipple's Heat Recorder), equipment for the study of the gas laws (including temperature-pressure apparatus for high pressures), steam pressure gauges, Peugeot Engine and the Davidson apparatus demonstrating the principles of domestic hot-water installations. Extensions of the equipment are being planned to permit of making comparative measurements of the thermal conductivity of building materials.
- (d) AN ELECTRICITY LABORATORY equipped for experimental work on D.C. with special equipment for use in connection with the courses in Automobile Electricity.

Drawing Offices and Art Room

There are six well equipped and well lighted Drawing Offices and an Art Room covering in the aggregate a floor area of 7,000 sq. ft. The Art Room is provided with a good selection of models and plaster casts.

Workshops

Fully equipped workshops are provided as follows :

Brickwork and Masonry, Carpentry and Joinery, Wood-cutting Machinery, Plumbing (equipped with oxy-acetylene welding, cutting and lead-burning plants), Plastering, Painting and Decorating, Cabinetmaking, Coach and Motor-body Building, Coachpainting and Coachtrimming.

There is a building yard in which students of the several building classes co-operate in the erection of small buildings.

Classrooms and Lecture Rooms

There are a number of well-lighted classrooms equipped on modern lines and covering in the aggregate a floor area of over 6,000 sq. ft. and a Cinema Theatre with seating for 200 students.

Gymnasium

A large Gymnasium covering a floor area of 2,200 sq. ft. is provided for Physical Training.

Surveying and Levelling Equipment for class work and field work includes 100-ft. and Gunter's chains and accessories; two improved Dumpy levels and one Croke Throughton level; theodolite; levelling staffs; plane-table clinometer; prismatic compass; planimeter; the usual scales, computing scales, proportional dividers, protractors, etc.

Models and Specimens

A large collection of Building Construction models has been acquired and is constantly being added to. These include scale and full-size models of carpentry and joinery construction, plumbing work, structural engineering details, sanitation and drainage details, full-size specimens of brickwork and masonry and combined building details, examples of decorative plasterwork and specimens of building materials.

Visual Aids

The following visual aids are provided :—

35 mm. silent film projector; 16 mm. sound film projector; film strip projector; slide projectors and epidiroscope.

COURSES AND TIME TABLES

1. ARCHITECTURE, SURVEYING, CIVIL ENGINEERING, AND
BUILDING TECHNOLOGY

WHOLE-TIME COURSE IN ARCHITECTURE

SUBJECT	Hours per Week	Room	Teacher	No. of Syllabus
FIRST YEAR.				
Architectural Drawing and Design—I	15	B 17	A. Brady	100, 101
Building Construction—Elem.	6	B 17	B. O'Reilly	106
History of Architecture—I	1½	B 15	B. O'Reilly	112
Free Drawing and Modelling—I	3	B 24	J. Hannan	115
Plane and Solid Geometry }	1½	B 17	R. Grimes	135, 136
Perspective and Sciagraphy }				140
Mathematics and Mechanics	3	B 18	W. O'Brien	3, 121
Bricklaying and Masonry (Practical)	3	C 17	E. Byrne	141
SECOND YEAR.				
Architectural Design—II	13½	B 13	D. O'Dwyer,	102
Building Construction—Inter. I	6	B 12, 13	B. O'Reilly	107
History of Architecture—II	1½	B 15	B. O'Reilly	113
Free Drawing and Modelling—II	3	B 24	J. Hannan	116
Mechanics, Strength of Materials and Theory of Structures	3	B 18	W. O'Brien	121, 124
Physics (Heat and Electricity) }	3	A 11	S. Knight	127, 128
Chemistry }				131
Carpentry and Joinery (Practical)	3	B 21	R. Grimes	142
THIRD YEAR.				
Architectural Design—III.	13½	B 12	D. O'Dwyer,	103
Building Construction—Inter. II	6	B 12	B. O'Reilly	108
Free Drawing and Modelling—III.	3	B 24	J. Hannan	117
Strength of Materials and Theory of Structures	3	B 18	W. O'Brien	124
History of Architecture—III	1½	B 15	B. O'Reilly	114
Physics (Sound and Light)	1½	A 5	W. Hickson	129, 130
Surveying and Levelling	1½	B 18	W. O'Brien	132
Plumbing (Practical)	3	B 11	J. Bolton	143

Note.—On completion of the third year in this course students transfer to the fourth year of the part-time course (see page 29).

PART-TIME COURSE IN ARCHITECTURE

Class No.	Subject	Day Classes	Evening Classes		Room	Teacher	No. of Syllabus
		Hrs./week	Day	Hour			
	FIRST YEAR :						
	Architectural Drawing and Design—I	9			B 18	A. Brady	100
	History of Architecture—I	1½			B 15	B. O'Reilly	101
	Free Drawing and Modelling—I	1½			B 24	J. Hannan	115
200	Building Construction—Elem.—I		Mon.	7.30–9.30	B 18	P. Tuite	106
201	Do. do. do.		Thurs.	7.30–9.30	B 18	P. Tuite	106
6	Physics (Heat)—Elem.		Fri.	7.30–9.30	A 11	S. O'Tuama	14
	SECOND YEAR :						
	Architectural Design—II	9			B 13	D. O'Dwyer	102
	History of Architecture—II	1½			B 15	B. O'Reilly	113
	Free Drawing and Modelling—II	1½			B 24	J. Hannan	116
202	Building Construction—Inter. I		Mon.	7.30–9.30	B 12	A. Brady	107
203	Building Construction—Inter I		Tues.	7.30–9.30	B 12	A. Brady	107
204	Mechanics—Elem....		Thurs.	7.30–9.30	A 8	M. Niall	121
	THIRD YEAR :						
	Architectural Design ¹ —III	9			B 12	D. O'Dwyer	
	History of Architecture—III	1½			B 15	B. O'Reilly	103
	Free Drawing and Modelling—III	1½			B 24	J. Hannan	114
206	Building Construction—Inter. II		Friday	7.30–9.30	B 12		117
207	Surveying and Levelling ²		Wed.	7.30–9.30	B 18	W. O'Brien	108
208	Strength of Materials and Theory of Structures—Inter.		Tues.	7.30–9.30	B 18	W. O'Brien	132
	FOURTH YEAR :						
	Architectural Design ¹ —IV	9			B 12	D.O'Dwyer	
209	Building Construction—Adv. I		Mon.	7.30–9.30	B 27	B. O'Reilly	104
210	Structural Engineering—Adv.		Fri.	7.30–9.30	B 18	J. O'Neill	109
						W. O'Brien	125

FIFTH YEAR :						
	Architectural Design ¹ —V	9			B 12 D. O'Dwyer B. O'Reilly J. O'Neill	105 111
211	Specifications and Materials		Wed.	7.30-9.30	B 28	
210	Structural Engineering— Adv.		Fri.	7.30-9.30	B 18 W. O'Brien	125

Notes:

1. Evening Classes in Design for third, fourth and fifth year students who are unable to attend the afternoon classes will be provided if sufficient applications are received to justify the formation of these classes.

2. Fieldwork on Saturday afternoons during late Spring and early Summer.

WHOLE-TIME COURSE IN QUANTITY AND BUILDING SURVEYING

	Subject	Hrs. per Week	Room	Teacher	No. of Syllabus
FIRST YEAR :					
	Building Construction—Elem. I	6	B 13	B. O'Reilly	106
	Draughtsmanship—I	3	B 13	A. Brady, J. O'Neill	144
	Geometry—Plane and Solid—Elem. I ...	1½	B 17	R. Grimes	135
	Free Drawing—I	1½	B 24	J. Hannan	115
	Mensuration and Trigonometry—I ...	1½	B 18	W. O'Brien	146
	Surveying and Levelling—I	3	B 18	W. O'Brien	132
	Book-keeping—Elem. I	3	B 27	G. Walsh	147
	Economics—I	3	B 27	G. Walsh	149
	Legal Subjects—I	3	B 17	H. McDevitt	151
SECOND YEAR :					
	Building Construction—Inter. I... ..	6	B 12	B. O'Reilly	107
	Draughtsmanship—II	3	B 13	A. Brady	145
	Surveying and Levelling—II	6	B 18	W. O'Brien	133
	Book-keeping—Elem. II	3	B 27	G. Walsh	148
	Economics—II	3	B 27	G. Walsh	150
	Legal Subjects—II	3	B 17	H. McDevitt	152
	Quantities—Inter.	3	C 21	M. J. Burke	153
THIRD YEAR :					
	Building Construction—Inter II	6	B 12	B. O'Reilly	108
	Draughtsmanship—III	4½	B 13	A. Brady	145
	Surveying and Levelling—III	4½	B 18	W. O'Brien	134
	Legal Subjects—III	3	C 21	H. McDevitt	155

Note.—The second year of the course ends in March, 1951

PART-TIME COURSE IN QUANTITY AND BUILDING SURVEYING

Class No.	Subject	Day Classes	Evening Classes		Room	Teacher	No. of Syllabus
		Hrs./week	Day	Hour			
	FIRST YEAR :						
	Book-keeping—Elem. I ...	3			B 27	G. Walsh	147
	Economics—I	3			B 27	G. Walsh	149
	Legal Subjects—I... ..	3			B 17	H. McDevitt	151
200	Building Construction— Elem. I		Mon.	7.30-9.30	B 18	P. Tuite	106
201	Building Construction— Elem.—I		Thurs.	7.30-9.30	B 18	P. Tuite	106
8	Mathematics—Elem. ...		Wed.	7.30-9.30	B 26	W. O'Doherty	2
	SECOND YEAR :						
	Quantities—Inter. ...	3			C 21	M. Burke	153
	Book-keeping—Elem. II ...	3			B 27	G. Walsh	148
	Economics—II	3			B 27	G. Walsh	150
	Legal Subjects—II	3			B 17	H. McDevitt	152
202	Building Construction— Inter. I		Mon.	7.30-9.30	B 18	A. Brady	107
203	Building Construction— Inter. I		Tues.	7.30-9.30	B 12	A. Brady	107
207	Surveying and Levelling ¹ ...		Wed.	7.30-9.30	B 18	W. O'Brien	132
204	Mechanics—Elem. ...		Thurs.	7.30-9.30	A 8	M. Niall	121
	THIRD YEAR :						
	Legal Subjects	3			C 21	H. McDevitt	155
212	Building Construction— Inter. II		Thurs.	7.30-9.30	B 12		108
206	Building Construction— Inter. II		Friday	7.30-9.30	B 12		108
	Quantities—Inter. ² ...	6				M. Burke	153
208	Strength of Materials and Theory of Structures —Inter.		Tues.		B 18	W. O'Brien	124

Note.—1. Fieldwork on Saturday afternoons during late Spring and early Summer.

2. An alternative evening class in Quantities will be provided in the third year.

EVENING COURSE IN QUANTITY AND BUILDING SURVEYING

Class No.	SUBJECT	Day	Hour	Room	TEACHER	No. of Syllabus
	THIRD YEAR :					
212	Building Construction—Inter. II	Thursday	7.30–9.30	B 12	H. Darker	10
206	Building Construction—Inter. II	Friday	7.30–9.30	B 12		10
213	Quantities—Inter.... 	Monday	7.30–9.30	B 26		15
208	Strength of Materials and Theory of Structures—Inter. 	Tuesday	7.30–9.30	B 18	W. O'Brien	124
	FOURTH YEAR :					
209	Building Construction—Adv. I ...	Monday	7.30–9.30	B 27	J. O'Neill	109
212	Building Construction—Adv. I ...	Thursday	7.30–9.30	B 12	H. Darker	109
213	Quantities—Adv. 	Tuesday	7.30–9.30	A 8		154
	FIFTH YEAR :					
213	Quantities—Adv. 	Tuesday	7.30–9.30	A 8	H. Darker	154
211	Specifications and Materials ...	Wednesday	7.30–9.30	B 28	J. O'Neill	111

EVENING COURSE IN CIVIL ENGINEERING

FIRST YEAR:						
8	Mathematics—Elem. II ...	Wednesday	7.30–9.30	B 26	W. O'Doherty	2
7	Mechanics—Elem. II ...	Tuesday	7.30–9.30	A 5	E. P. Dunne	8
SECOND YEAR:						
12	Mathematics—Inter. I ...	Wednesday	7.30–9.30	B 27	G. Latchford	3
11	Applied Mechanics—Inter. I ...	Thursday	7.30–9.30	A 5	E. P. Dunne	9
THIRD YEAR:						
16	Mathematics—Inter. II ...	Thursday	7.30–9.30	B 27	G. Latchford	4
208	Strength of Materials and Theory of Structures—Inter. ...	Tuesday	7.30–9.30	B 18	W. O'Brien	124
15	Applied Mechanics—Inter. II ...	Friday	7.30–9.30	A 5	E. P. Dunne	10
207	Surveying and Levelling ¹ —I ...	Wednesday	7.30–9.30	B 18	W. O'Brien	132
FOURTH YEAR:						
210	Structural Engineering—Adv.	Friday	7.30–9.30	B 18	W. O'Brien	125
214	Concrete—Plain and Reinforced	Wednesday	7.30–9.30	B 29	—	126
215	Surveying and Levelling—II	Thursday	7.30–9.30	B 29	W. O'Brien	133

Note: 1. Fieldwork on Saturday afternoons during late Spring and early Summer.

EVENING COURSES IN BUILDING TECHNOLOGY

Course A

Class No.	SUBJECT	Day	Hour	Room	TEACHER	No. of Syllabus
INTRODUCTORY YEAR:						
4	Mathematics—Elem. I ...	Friday	7.30–9.30	B 26	W. O'Doherty	1
3	Mechanics—Elem. I ...	Monday	7.30–9.30	A 5	E. Dunne	7
216	Mechanical Drawing—Elem. ...	Thursday	7.30–9.30	C 7	M. McGoldrick	156
FIRST YEAR:						
217,	Building Construction—Elem. ...	Mon., Thur.	7.30–9.30	B 17	A. Briescu	106
218		Wednesday	7.30–9.30	B 26	W. O'Doherty	2
8		Tuesday	7.30–9.30	A 5	E. P. Dunne	8
7	Mechanics—Elem. II ...					
SECOND YEAR:						
202	Building Construction—Inter. I	Monday	7.20–9.30	B 12	A. Brady	107
203	Building Construction—Inter. I	Tuesday	7.30–9.30	B 12	A. Brady	107
12	Mathematics—Inter. I ...	Wednesday	7.30–9.30	B 27	G. Latchford	3
11	Applied Mechanics—Inter. I ...	Thursday	7.30–9.30	A 5	E. P. Dunne	9
THIRD YEAR:						
212	Building Construction—Inter. II	Thursday	7.30–9.30	B 12	—	108
206	Building Construction—Inter. II	Friday	7.30–9.30	B 12	—	108
208	Strength of Materials and Theory of Structures—Inter. ...	Tuesday	7.30–9.30	B 18	W. O'Brien	124
FOURTH YEAR:						
209	Building Construction—Adv. I ...	Monday	7.30–9.30	B 27	J. O'Neill	109
212	Building Construction—Adv. I ...	Thursday	7.30–9.30	B 12	—	109
210	Structural Engineering—Adv. ...	Friday	7.30–9.30	B 18	W. O'Brien	125
FIFTH YEAR:						
212	Building Construction—Adv. II	Thursday	7.30–9.30	B 12	—	110
211	Specifications and Materials ...	Wednesday	7.30–9.30	B 28	J. O'Neill	111
210	Structural Engineering—Adv. ...	Friday	7.30–9.30	B 18	W. O'Brien	125

Course B

Class No.	SUBJECT	Day	Hour	Room	TEACHER	No. of Syllabus
4	INTRODUCTORY YEAR:					
	Mathematics—Elem. I ...	Friday	7.30-9.30	B 26	W. O'Doherty	1
216	Mechanical Drawing—Elem. ...	Thursday	7.30-9.30	C 7	M. McGoldrick	156
217	FIRST YEAR:					
218	Building Construction—Elem. ...	Mon., Thur.	7.30-9.30	B 17	A. Brioscu	106
8	Mathematics—Elem. II	Wednesday	7.30-9.30	B 26	W. O'Doherty	135
	SECOND YEAR:					
202	Building Construction—Inter. I	Monday	7.30-9.30	B 12	A. Brady	107
203	Building Construction—Inter. I	Tuesday	7.30-9.30	B 12	A. Brady	107
207	Surveying and Levelling ¹	Wednesday	7.30-9.30	B 18	W. O'Brien	132
	THIRD YEAR:					
212	Building Construction—Inter. II	Thursday	7.30-9.30	B 12		108
206	Building Construction—Inter. II	Friday	7.30-9.30	B 12		108
213	Quantities—Inter. ...	Monday	7.30-9.30	B 26	H. Darker	153
	FOURTH YEAR:					
209	Building Construction—Adv. I ...	Monday	7.30-9.30	B 27	J. O'Neill	109
212	Building Construction—Adv. I ...	Thursday	7.30-9.30	B 12		109
213	Quantities—Adv. ...	Tuesday	7.30-9.30	A 8	H. Darker	154
	FIFTH YEAR:					
212	Building Construction—Adv. II	Thursday	7.30-9.30	B 12		110
211	Specifications and Materials ...	Wednesday	7.30-9.30	B 28	J. O'Neill	111
213	Quantities—Adv. ...	Tuesday	7.30-9.30	A 8	H. Darker	154

EVENING COURSE IN SURVEYING AND LEVELLING

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
207	FIRST YEAR:					
	Surveying and Levelling ¹ ...	Wednesday	7.30-9.30	B 18	W. O'Brien	132
215	SECOND YEAR:					
	Surveying and Levelling ¹ ...	Thursday	7.30-9.30	B 29	W. O'Brien	133

Note: ¹ Fieldwork on Saturday afternoons during late Spring and early Summer.

2. COURSES IN THE BUILDING, FURNITURE, AND COACHBUILDING TRADES

(Trade Apprentices)

EVENING COURSE IN BRICKLAYING AND STONELAYING

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
	FIRST YEAR:					
219	Trade, Practice—1A ...	Mon.	7.30-9.30	C 17	J. Thornberry	157
220	Trade, Drawing and Theory—I ...	Friday	7.30-9.30	C 22	J. Thornberry	158
221	Trade, Practice—I B ...	Thurs.	7.30-9.30	C 17	A. Williams	157
220	Trade, Drawing and Theory—I ...	Friday	7.30-9.30	C 22	J. Thornberry	158
	SECOND YEAR:					
222	Trade, Practice—2 A ...	Wed.	7.30-9.30	C 17	A. Williams	159
223	Trade, Drawing and Theory—2 ...	Mon.	7.30-9.30	C 20	A. Williams	160
224	Trade, Practice—2 B ...	Friday	7.30-9.30	C 17	A. Williams	159
223	Trade, Drawing and Theory—2 ...	Mon.	7.30-9.30	C 20	A. Williams	160
	THIRD YEAR:					
225	Trade, Practice—3 ...	Tues.	7.30-9.30	C 17	D. Cox	161
226	Trade, Drawing and Theory—3 ...	Friday	7.30-9.30	C 20	D. Cox	162
	FOURTH YEAR:					
225	Trade, Practice—4 ...	Tues.	7.30-9.30	C 17	A. Williams	163
227	Trade, Drawing and Theory—4 ...	Thurs.	7.30-9.30	C 2	D. Cox	164

EVENING COURSE IN CARPENTRY AND JOINERY

	INTRODUCTORY:					
228	Trade, Practice—Intro. A ...	Mon.	7.30-9.30	B 20	D. Molumby	165
229	Workshop Drawing—A ...	Friday	7.30-9.30	B 24	M. McGoldrick	166
230	Trade, Practice—Intro. B ...	Tues.	7.30-9.30	B 20	N. Fagan	165
229	Workshop Drawing—A ...	Friday	7.30-9.30	B 24	M. McGoldrick	166
231	Trade, Practice—Intro. C ...	Mon.	7.30-9.30	B 22	M. Nolan	165
232	Workshop Drawing—B ...	Wed.	7.30-9.30	B 17	M. Nolan	166
233	Trade, Practice—Intro. D ...	Friday	7.30-9.30	B 20	D. Molumby	165
232	Workshop Drawing—B ...	Wed.	7.30-9.30	B 17	M. Nolan	166
234	Trade Practice—Intro. E	Fri.	7.30-9.30	C 8	C. Costello	165
235	Workshop Drawing—C	Tues.	7.30-9.30	B 23	M. McGoldrick	166
	FIRST YEAR:					
236	Trade, Practice—I A ...	Wed.	7.30-9.30	B 22	D. Molumby	167
237	Trade, Theory and Drawing—I A ...	Tues.	7.30-9.30	B 17	J. Cunningham	168
238	Trade, Practice—I B ...	Mon.	7.30-9.30	B 21	J. O'Byrne	167
237	Trade, Theory and Drawing—I A ...	Tues.	7.30-9.30	B 17	J. Cunningham	168
239	Trade, Practice—I C ...	Tues.	7.30-9.30	B 21	J. O'Byrne	167
240	Trade, Theory and Drawing—I B ...	Friday	7.30-9.30	B 17	J. Cunningham	168

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
241	Trade Practice—ID	Mon.	7.30-9.30	B 23	—	167
240	Trade Theory and Drawing—I B ...	Friday	7.30-9.30	B 17	J. Cunningham	168
SECOND YEAR:						
242	Trade, Practice—2 A	Friday	7.30-9.30	B 21	J. O'Byrne	169
243	Trade, Theory and Drawing—2 A ...	Mon.	7.30-9.30	B 24	J. Cunningham	170
244	Trade, Practice—2 B	Thurs.	7.30-9.30	B 20	D. Molumby	169
243	Trade, Theory and Drawing—2 A ...	Mon.	7.30-9.30	B 24	J. Cunningham	170
245	Trade Practice—2 C	Friday	7.30-9.30	B 23	M. Nolan	169
246	Trade Theory and Drawing—2 B ...	Wed.	7.30-9.30	B 12	—	170
THIRD YEAR:						
247	Trade, Practice—3 A	Thurs.	7.30-9.30	B 21	J. O'Byrne	171
248	Trade, Theory and Drawing—3 A ...	Tues.	7.30-9.30	B 24	T. Bridgeman	172
249	Trade, Practice—3 B	Thurs.	7.30-9.30	B 22	—	171
248	Trade, Theory and Drawing—3 A ...	Tues.	7.30-9.30	B 24	T. Bridgeman	172
FOURTH YEAR:						
250	Trade, Practice—4 A	Wed.	7.30-9.30	B 20	T. Bridgeman	173
251	Trade, Theory and Drawing—4 A ...	Thurs.	7.30-9.30	B 24	T. Bridgeman	174
252	Trade, Practice—4 B	Wed.	7.30-9.30	B 21	J. O'Byrne	173
251	Trade, Theory and Drawing—4 A ...	Thurs.	7.30-9.30	B 24	T. Bridgeman	174

EVENING COURSE IN WOODCUTTING MACHINISTS' WORK

FIRST YEAR:						
253	Trade, Practice—I A	Tues.	7.30-9.30	C 18	J. Wall	175
254	Trade, Theory and Drawing—I ...	Mon.	7.30-9.30	C 7	J. Wall	176
255	Trade, Practice—I B	Wed.	7.30-9.30	C 18	J. Keogh	175
254	Trade, Theory and Drawing—I ...	Mon.	7.30-9.30	C 7	J. Wall	176
SECOND YEAR:						
256	Trade, Practice—2	Friday	7.30-9.30	C 18	J. Keogh	177
257	Trade, Theory and Drawing—2 ...	Wed.	7.30-9.30	C 7	J. Wall	178
THIRD YEAR:						
258	Trade, Practice—3	Mon.	7.30-9.30	C 18	J. Keogh	179
259	Trade, Theory and Drawing—3 ...	Friday	7.30-9.30	C 7	J. Wall	180
FOURTH YEAR:						
260	Trade, Practice—4	Thurs.	7.30-9.30	C 18	J. Wall	181
259	Trade, Theory and Drawing—4 ...	Friday	7.30-9.30	C 7	J. Wall	182

EVENING COURSE IN PLUMBING

Class No.	SUBJECT	Day	Hour	Room	TEACHER	No. of Syllabus
FIRST YEAR.						
261	Trade, Theory and Drawing					
	—1.	Thurs.	7.30-9.30	B 26	J. Darby	184
262	Trade, Pract.—I.	Tues.	7.30-9.30	D 11	D. Rooney	183
SECOND YEAR.						
263	Trade, Theory and Drawing					
	—2.	Mon.	7.30-9.30	B 28	D. McGrath	186
264	Trade, Pract.—2.	Fri.	7.30-9.30	D 11	D. Rooney	185
THIRD YEAR						
265	Trade, Theory and Drawing					
	—3.	Fri.	7.30-9.30	B 28	D. McGrath	188
266	Trade, Pract.—3.	Mon.	7.30-9.30	D 11	D. Rooney	187
FOURTH YEAR.						
267	Trade, Theory and Drawing					
	—4.	Tues.	7.30 9.30	B 28	J. Bolton	190
268	Trade, Pract.—4.	Thurs.	7.30 9.30	D 11	D. Rooney	189
FIFTH YEAR						
269	Trade, Theory and Drawing					
	—5.	Thurs.	7.30-9.30	B 28	D. McGrath	192
270	Trade, Pract.—5.	Wed.	7.30-9.30	D 11	D. Rooney	191

EVENING COURSE IN PLASTERING

FIRST YEAR:						
271	Trade, Practice—I	Friday	7.30-9.30	C 16	L. Comerford	193
272	Trade, Theory and Drawing—I ...	Tues.	7.30-9.30	C 7	J. Saunders	194
273	Free Drawing—I	Wed.	7.30-9.30	B 24	J. Hannan	198
SECOND YEAR:						
274	Trade, Practice and Theory—2 ...	Tues.	7.30-9.30	C 16	L. Comerford	195
275	Trade, Practice and Theory—2 ...	Thurs.	7.30-9.30	C 16	L. Comerford	195
THIRD YEAR:						
276	Trade, Practice and Theory—3 ...	Mon.	7.30-9.30	C 16	L. Comerford	196
277	Trade, Practice and Theory—3 ...	Wed.	7.30-9.30	C 16	L. Comerford	196
FOURTH YEAR:						
276	Trade, Practice and Theory—4 ...	Mon.	7.30-9.30	C 16	L. Comerford	197
277	Trade, Practice and Theory—4 ...	Wed.	7.30-9.30	C 16	L. Comerford	197

EVENING COURSE IN PAINTING AND DECORATING

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
FIRST YEAR:						
278	Trade, Practice—I	Mon.	7.30-9.30	C 11	J. Kenny	199
279	Trade, Theory and Drawing—I ...	Tues.	7.30-9.30	C. 20	P. Gordon	200
273	Free Drawing—I	Wed.	7.30-9.30	B 24	J. Hannan	198
SECOND YEAR:						
280	Trade, Theory and Practice—2 ...	Wed.	7.30-9.30	C 11	P. Gordon	201
281	Trade, Theory and Practice—2 ...	Thurs.	7.30-9.30	C 11	P. Gordon	201
THIRD YEAR:						
282	Trade, Theory and Practice—3 ...	Tues.	7.30-9.30	C 11	J. Kenny	202
283	Trade, Theory and Practice—3 ...	Friday	7.30-9.30	C 11	J. Kenny	202
FOURTH YEAR:						
282	Trade, Theory and Practice—4 ...	Tues.	7.30-9.30	C 11	J. Kenny	203
283	Trade, Theory and Practice—4 ...	Friday	7.30-9.30	C 11	J. Kenny	203

EVENING COURSE IN CABINETMAKING

THIRD YEAR:						
284	Trade, Theory and Practice—3 ...	Mon.	7.30-9.30	C 8	C. Costello	206
285	Trade, Theory and Practice—3 ...	Wed.	7.30-9.30	C 8	C. Costello	206
FOURTH YEAR:						
286	Trade, Theory and Practice—4 ...	Tues.	7.30-9.30	C 8	C. Costello	207
287	Trade, Theory and Practice—4 ...	Thurs.	7.30-9.30	C 8	C. Costello	207

EVENING COURSE IN COACH AND MOTOR BODY BUILDING

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
INTRODUCTORY COURSE:						
288	Trade, Practice: Intro.—F ...	Friday	7.30-9.30	D 17	H. Dempsey	165
289	Workshop, Drawing—D ...	Wed.	7.30-9.30	C 2	P. O'Reilly	166
FIRST YEAR:						
290	Trade, Practice—I	Tues.	7.30-9.30	D 17	H. Dempsey	208
291	Trade, Theory and Drawing—I ...	Friday	7.30-9.30	C 2	P. O'Reilly	209
SECOND YEAR:						
292	Trade, Practice—2	Wed.	7.30-9.30	D 17	H. Dempsey	210
293	Trade, Theory and Drawing—2 ...	Tues.	7.30-9.30	C 2	P. O'Reilly	211
THIRD YEAR:						
294	Trade, Practice—3	Thurs.	7.30-9.30	D 17	H. Dempsey	212
295	Trade, Theory and Drawing—3 ...	Mon.	7.30-9.30	D 17	P. O'Reilly	213
FOURTH YEAR:						
294	Trade, Practice—4	Thurs.	7.30-9.30	D 17	H. Dempsey	214
295	Trade, Theory and Drawing—4 ...	Mon.	7.30-9.30	D 17	P. O'Reilly	216

EVENING COURSE IN COACHTRIMMING

FIRST YEAR:						
296	Trade, Theory and Practice—I ...	Mon.	7.30-9.30	D 16	S. McConaill	216
297	Trade, Theory and Practice—I ...	Wed.	7.30-9.30	D 16	S. McConaill	216
SECOND YEAR:						
296	Trade, Theory and Practice—2 ...	Mon.	7.30-9.30	D 16	S. McConaill	217
297	Trade, Theory and Practice—2 ...	Wed.	7.30-9.30	D 16	S. McConaill	217
THIRD YEAR:						
298	Trade, Theory and Practice—3 ...	Tues.	7.30-9.30	D 16	S. McConaill	218
299	Trade, Theory and Practice—3 ...	Thurs.	7.30-9.30	D 16	S. McConaill	218
FOURTH YEAR:						
298	Trade, Theory and Practice—4 ...	Tues.	7.30-9.30	D 16	S. McConaill	219
299	Trade, Theory and Practice—4 ...	Thurs.	7.30-9.30	D 16	S. McConaill	219

EVENING COURSE IN COACHPAINTING

Class No.	Subject	Day	Hour	Room	Teacher	No. of Syllabus
FIRST YEAR :						
300	Trade, Theory and Practice—I ...	Tues.	7.30-9.30	C 12	R. McNamara	220
273	Free Drawing—I ...	Wed.	7.30-9.30	B 24	J. Hannan	198
SECOND YEAR :						
301	Trade, Theory and Practice—2 ...	Friday	7.30-9.30	C 12	P. McKenna	221
302	Trade, Theory and Practice—2 ...	Wed.	7.30-9.30	C 12	R. McNamara	221
THIRD YEAR :						
303	Trade, Theory and Practice—3 ...	Mon.	7.30-9.30	C 12	R. McNamara	222
304	Trade, Theory and Practice—3 ...	Thurs.	7.30-9.30	C 12	R. McNamara	222
FOURTH YEAR :						
303	Trade, Theory and Practice—4 ...	Mon.	7.30-9.30	C 12	R. McNamara	223
304	Trade, Theory and Practice—4 ...	Thurs.	7.30-9.30	C 12	R. McNamara	223

PART-TIME DAY COURSE IN CARPENTRY AND JOINERY

Subject	Hours per Week	Room	Teacher	No. of Syllabus
FIRST YEAR :				
Workshop, Drawing ...	1½	B 17	R. Grimes	166
Trade, Theory and Practice—I ...	4½	B 21	T. Bridgeman	165, 167, 168
SECOND YEAR :				
Plane and Solid Geometry ...	1½	B 17	R. Grimes	135, 136
Trade, Theory and Practice—2 ...	4½	B 21	T. Bridgeman	169, 170
THIRD YEAR :				
Plane and Solid Geometry ...	1½	B 17	R. Grimes	137
Trade, Theory and Practice—3 ...	4½	B 21	T. Bridgeman	171, 172

PART-TIME DAY AND EVENING COURSE IN WOODCUTTING MACHINISTS' WORK

Class No.	Subject	Day Classes	Evening Classes		Room	Teacher	No. of Syllabus
		Hrs./week	Day	Hour			
254	FIRST YEAR :						
	Workshop Drawing—I	1½			B 17	R. Grimes	166
	Woodwork—I ...	3			B 22	R. Grimes	165
	Metalwork—I ...	1½			D 5	O. Crotty	224
	Trade, Theory and Drawing—I ...		Monday	7.30-9.30	C 7	J. Wall	176
253	Trade, Practice—I A ...		Tuesday	7.30-9.30	C 18	J. Wall	175
257	SECOND YEAR :						
	Plane & Solid Geometry	1½			B 17	R. Grimes	135, 136
	Woodwork—2 ...	3			B 21	R. Grimes	226
	Metalwork and Welding—2 ...	1½			D 5	O. Crotty	225
	Trade, Theory and Drawing—2 ...		Wednes.	7.30-9.30	C 7	J. Wall	178
256	Trade, Practice—2 ...		Friday	7.30-9.30	C 18	J. Keogh	177

Note.—On completion of the second year in this course, students transfer to the third year of the evening course (see page 36).

PART-TIME DAY COURSE IN PLUMBING

Subject	Hours per Week	Room	Teacher	No. of Syllabus
FIRST YEAR :				
Trade, Theory and Practice—I ...	6	D 11	J. Bolton	183, 184
SECOND YEAR :				
Trade, Theory and Practice—2 ...	6	D 11	J. Bolton	185, 186

Note.—On completion of the second year in this course, students transfer to the third year of the evening course (see page 37).

PART-TIME DAY COURSE IN PAINTING AND DECORATING

FIRST YEAR :				
Workshop Drawing—I ...	1½	B 17	R. Grimes	166
Free Drawing ...	1½	C 20	J. Hannan	198
Trade, Theory and Practice—I ...	3	C 11	C. O'Byrne	199, 200
SECOND YEAR :				
Plane and Solid Geometry ...	1½	B 17	R. Grimes	135, 136
Trade, Theory and Practice—2 ...	4½	C 11	C. O'Byrne	201, 202

Note.—On completion of the second year in this course, students transfer to the third year of the evening course (see page 38).

PART-TIME DAY COURSE IN CABINETMAKING

Subject	Day	Hour	Room	Teacher	No. of Syllabus
FIRST YEAR :					
Trade, Theory and Practice					
—I	Tuesday	9.0-12.30	C 8	M. Murray	204
Do. do. do.	Wednes.	9.0-12.30	C 8	M. Murray	204
Do. do. do.	Thursday	9.0-12.30	C 8	M. Murray	204
Do. do. do.	Saturday	9.0-12.30	C 8	M. Murray	204
SECOND YEAR :					
Trade, Theory and Practice					
—2	Monday	2.0-5.30	C 8	M. Murray	205
Do. do. do.	Tuesday	2.0-5.30	C 8	M. Murray	205
Do. do. do.	Wednes.	2.0-5.30	C 8	M. Murray	205
Do. do. do.	Thursday	2.0-5.30	C 8	M. Murray	205

Note.—On completion of the second year in this course, students transfer to the third year of the evening course (see page 38).

PART-TIME DAY AND EVENING COURSE IN COACH AND MOTOR BODY BUILDING

Class No.	Subject	Day Classes	Evening Classes		Room	Teacher	No. of Syllabus
		Hrs./week	Day	Hour			
	FIRST YEAR :						
	Workshop Drawing—I	1½			B 17	R. Grimes	166
	Woodwork—I	3			B 22	R. Grimes	165
	Metalwork—I	1½			D 5	O. Crotty	224
290	Trade, Practice—I ...		Tuesday	7.30-9.30	D 17	H. Dempsey	208
291	Trade, Theory and Drawing—I		Friday	7.30-9.30	C 2	P. O'Reilly	209
	SECOND YEAR :						
	Plane and Solid Geometry	1½			B 17	R. Grimes	135, 136
	Woodwork—2	3			B 21	R. Grimes	226
	Metalwork and Welding—2	1½			D 5	O. Crotty	225
292	Trade, Practice—2 ...		Wed.	7.30-9.30	D 17	H. Dempsey	210
293	Trade, Theory and Drawing—2		Tuesday.	7.30-9.30	C 2	P. O'Reilly	211

Note.—On completion of the second year in this course, students transfer to the third year of the evening course (see page 39).

PART-TIME DAY AND EVENING COURSE IN COACHPAINTING

Class No.	Subject	Day Classes	Evening Classes		Room	Teacher	No. of Syllabus
		Hrs./week	Day	Hour			
	FIRST YEAR :						
	Workshop Drawing—I	1½			B 17	R. Grimes	166
	Free Drawing	1½			C 20	J. Hannan	198
	Painting, Theory and Practice—I	3			C 11	C. O'Byrne	199, 200
300	Trade, Theory and Practice—I		Tuesday	7.30-9.30	C 12	R. McNamara	220
273	Free Drawing—I ...		Wednes.	7.30-9.30	B 24	J. Hannan	198
	SECOND YEAR :						
	Plane and Solid Geometry	1½			B 17	R. Grimes	135, 136
	Painting, Theory and Practice—2	4½			C 11	C. O'Byrne	201, 202
302	Trade, Theory and Practice—2		Wednes.	7.30-9.30	C 12	R. McNamara	221
301	Trade, Theory and Practice—2		Friday	7.30-9.30	C 12	P. McKenna	221

Note.—On completion of the second year in this course, students transfer to the third year of the evening course (see page 40).

SYLLABUSES OF SUBJECTS

1—MATHEMATICS—Elem. I

Prime nos., prime factors. L.C.M. Vulgar fractions: add. and sub., mult. and div. Decimals: add, sub., mult., and div.; approximations and limits of errors. Algebra: add. and sub. evaluation. Mult. and div. Factors. Indices; logs; characteristics. Mult. and div. by logs. Area: rect. and sq. problems. Vol. and surface area; prism and cube. Area: circle and ring. Vol. and surface area; cylinder. Log. calculations on above. Algebra: Simple equations. Formulae and substitution in Ratio and Proportion. Unitary method and compound pro. Algebra: fractions. Area: figures from plotted points. Building up progressions. Simultaneous Equations. Mid-ordinate rule. Percentages and averages.

Bisections—lines and angles. Constructing angles equal to given angles. Isosceles and equilateral triangles. Study of circle. Plotting points; graphs. Sum of angles of a triangle. Identical equality; triangles. Parallels and parallelogram. Area: triangles and parallelograms. Ratio as applied to lines. Ratio as applied to sides of right-angled triangle. Tan., sin. of an acute angle. Tan. and sin. as multipliers. Angles in a semi-circle. Application; tan. and sin. Cos of an acute angle. Sq. on hypotenuse and applications. Solution of right-angled triangles from above. Two sides of triangles compared with third. External angle=sum of interior, etc. $(a+b)^2$ by diagram. $(a-b)^2$ by diagram. Height problems. Ratios and their reciprocals. Graph of $\sin \theta$ to 90° Graph $2 \cos. \theta$ to 90°

2—MATHEMATICS—Elem. II

Vulgar fractions; calculations; problems. Decimals; approximations; limits of error. Substitution in formulae. Calculations based on "difference of two squares." Square root and application to diagonals. Mens. of solids based on rect. sq., trapezium. Problems on foregoing, using logs. Mens. of circle, hexagon, octagon. Vol.: cylinder and pipes. Graphs of straight line. Graphical sol of simultaneous equal. Quadratic equations: factors and completing square: Quadratic equations: formulae and problems. Graph of quadratic, maximum, minimum. Volume: pyramid and cone problems. Logs.;

powers and roots. Frustrums: cylinder and cone. Mens. of sphere. Proportion; percentages; averages. Scaling and arrangement of axes for statistical graphs. Statistical graphs. Sums of arith. and geom. progressions. Instreing means. Problems on above.

Parallels and parallelograms. Angles of closed rect. figures. Revision of trigonometrical ratios. Sq. on hypotenuse and ratios, 45° , 30° , 60° . Heights and distance problems based on 4 and 5. Isosceles triangle and application, *e.g.*, angles in circle and semi-circle. Identical equality; triangles. Revision of above. Solution of right-angled triangle. Angles of elevation and depression and problems on. Cyclic quadrilateral. Angles formed by tangent and chord. Radian measure. Equality in area: triangles and parallelograms. Graphs: $\sin.$ and $\cos. \theta$ to 360° . Sin. rule. Cos. rule. Solution of triangles by sin. and cos. rules. Problems involving above. Graph: $\tan. 0^\circ$ to 360° . Products of segments of chords. Height and distance problems. Euclid, Book II, 5 and 6.

3—MATHEMATICS—Inter. I

Mensuration; Cylinders; Pipes; Frustrums, etc. Substitution in formulae. Log. Solutions, *e.g.* $[1-0.2^5]$. Napierian Logarithms. Revision of Trigonometry. Sin. and Cosine Rules. Heights of towers; widths of rivers, etc. More difficult problems. Area of oblique sections. Graph of straight line. Graphical and algebraic solutions of simultaneous equations. Equation of straight line from experimental results. Quadratic equations. Theory and problems. Graphs of quadratic. Discriminant. Forms of graphs. Area under irregular Curves. Simpson's Rule, etc. Maximum and minimum. Algebraic and graphical treatment. Graphs of trigonometrical functions. Circular measure. Co-ordinate geometry of straight line. Forms of equation. Equation of tangent to circle. Geometry of the circle. Secants. Chord and tangent. Indices; Factors. Binomial Theorem. Approximations. Application. Trigonometry. Difficult problems. Arithmetical and Geometrical Series to n terms. Compound Interest. Problems. Exponential functions. Introduction to Differential Calculus. Differentiation of simple algebraic functions. Rate of Increase; Problems. Differentiation. Gradient of tangent. Tracing of curves.

4—MATHEMATICS—Inter II

Trigonometry. Graphs of $\sin. 2\theta$, etc. Projection: vector quantities, components of. $\sin.$, $\cos.$ and $\tan.$ of $(A \pm B)$, $2A$, etc. Simple identities of compound angles. Trig. equations. Functions: elements of limits. Revision of elementary differentiation. Differentiation of products and quotients. Differentiation of function of a function. Rates of increase. Velocity and acceleration problems. Successive differentiation. Maxima and minima. Tracing of curves: points of inflection. Differentiation of trigonometry and logarithmic functions. Indefinite integration: Standard forms. Definite integration; limits; areas. Areas and volumes of integration. Centroids and moments of inertia. Centres of pressure. Partial fractions. Revision of differentiation. Inverse functions. Curvature. Revision of series. Binomial theorem. Approximations. Graphical solution of equations, cubic, etc. Remainder theorem. Complex numbers. Argand diagram. Complex numbers. Work leading to Demoivre's theorem.

7—MECHANICS—Elem. I

Relative Density; Specific Gravity; Calculation of weights of parts. Measuring instruments: The Vernier; the Micrometer. Straight edge; Surface Plate; Gauges, "go" and "not." Force—Work = Force \times Distance. Work in an engine cylinder. Power; Horsepower; Horsepower developed in engine cylinder. Turning effect of a force—simple balance. Moments. Principle of moments. Moments: clockwise and anti-clockwise. Levers: Forms of Levers; Bell Crank Lever. Centre of Gravity. State of equilibrium. Introduction to machines—Load. Effort—Velocity Ratio. Principle of work—Mechanical advantage. Efficiency of Machines. Relation of V.R. mechanical advantage and efficiency of machines. The Screw Jack as a machine. Other simple machines. Dry Friction, two kinds—Static and Kinetic. Dry Friction: "Laws." Engineering materials: Ferrous group—iron; steel; special steel. Engineering materials: non-Ferrous group. Alloys. Elementary notions of Energy: Forms, conservation of. Parallelogram of Forces. Triangle of Forces. Revision of year's work, with examples.

8—MECHANICS—Elem. II

Introduction: Units, Mass Force, Weight. Force and its effects.

How a force is measured. Measurement of forces by coil springs. Force acting through a distance. Work. Examples. Work done in extending springs. Diagram of Work. Uniform forces. Variable forces. Work done in drawing a weight up an incline. Power: Horsepower. H.P. developed up and down inclines. Indicated Horse Power, Engine examples. The Indicator Diagram. Brake Horsepower; absorption dynamometers; mechanical efficiency. Engine Efficiency. Test of electric motor or oil engine. Energy: Forms: Conservation. Joules equivalent. Moments. Principle of moments. Meaning of equilibrium. Conditions for equilibrium:—No resulting force; no resulting moment. Reactions at Beam supports. Bell Crank Lever. System of Bell Crank Levers. Principle of work. Centre of Parallel Forces. Centre of Gravity. Determination of C. of G., *e.g.*, expt. inspection and calculation. Centre of Gravity; States of Equilibrium. Laws of Dry Friction: Graphs of μ_s and μ_k . Work done against Friction. Lubrication. Introduction to machines. Machines: V.R., M.A., and Efficiency. (Pulleys; wheel and axle; crab winch). Machines (continued). Screw Jack. Weston's Pulley Blocks. Engineering materials; properties and uses; heat treatment (elem.). Stress; Strain; Hooke's Law—E. Tensile Test. Stress: Strain—E. Graph of test; elastic limit; yield point; max. stress. Force a Vector quantity; Parallelogram of Forces. Triangle of Forces; Examples. Application to Jib Crane; inclined plane; roof truss, etc. Lectures are supplemented by Demonstrations and Experiments.

9—APPLIED MECHANICS—Inter. I

Fundamental Units. Weight; Gravity; Inverse square law. Force and work. Work done by inclined forces. Principle of work. Inclined plane. Work done by a variable force. Diagram of work. Hypothetical Indicator Diagram. Boyle's Law Curve. Power; Horsepower; I.H.P. The Indicator Diagram. B.H.P. methods of measurements. Mechanical efficiency. Exam. of indicator and parts. Determination of I.H.P., Friction H.P., B.H.P., and Mechanical Efficiency. Revision of moments; conditions of equilibrium. Reactions at Beam supports. Bending moments and shearing force by calculation. Measurement of angles; Torque. Work done by a Torque. Torque and Rolling Wheels. Rolling

Friction; Flat Wheels; Track laying vehicles. Transmission of Motion and Power. Belts and Pulleys. Tension in Belts; Slip; Creep; H.P. transmitted. Systems of Belts; V.R. with and without Slips; Design of Belt System. Vector and Scalar quantities. Speed and Velocity. Acceleration. Formulae for uniform acceleration. Acceleration due to gravity; "g"; Expt. Body falling from height. Combined horizontal Velocity with Free fall; Projectiles. Revision of Components of a Force. Polygon of Forces. Simple Vector diagrams. Vector diagrams; Bow's notation; Forces in Frames Space and Vector diagrams and rules. Examples. Centre of gravity. (Revision). Centroids of Beam sections, etc. Centre of gravity. Bodies with holes and more difficult examples. Revision. C.G. proportional to length, area, volume. Stress; Strain—E. Commercial testing of materials. Tension; compression; shear. Properties of materials; work hardening; fatigue; heat treatment. Thin cylinders subjected to internal pressure. Boiler shell thickness; Shear Stress. Examples. Simple rivetted joints. Revision of machines, V.R., M.A., and Efficiency. Problems; test of some machines. Machines.

10—APPLIED MECHANICS—Inter. II

Revision of units; force; work; power; moments; energy. Displacement; motion; speed; velocity. S.T. and V.T. diagrams. V.T. diagrams deduced from S.T. diagram. Acceleration. A.T. diagram deduced from S.T. diagrams. Fletcher Trolley. Uniform acceleration with initial velocity. Difficult examples. Vector and Scalar quantities. Relative and Resultant velocities. Point moving in a circle; acceleration towards the centre. Acceleration due to gravity. Determination of "g" by Pendulum. Mass; Inertia; Units of Mass; Relation of Mass and Force. Angular Velocity; Centripetal and Centrifugal forces; Superelevation; Governors. Simple and Watt types, etc. Elementary balancing; Cross balance. Masses in more than one plane. Momentum; impulse. Fletcher Trolley and Buffers. Conservation of momentum. Impacts of moving bodies. Energy; Forms; Conservation. Potential and Kinetic Energy. Use of the two principles—the conservation of energy and the conservation of momentum. K.E. of rotating masses. The fly press; the flywheel. Moment of Inertia. $T = I\Phi$ —examples. Kinetic Energy of Flywheel; Energy fluctuations. $\frac{dE}{E} = \frac{2dw}{w}$ Simple Harmonic Motion.

Problems on S.H.M. S.H.M.; Reciprocating parts; adjustment of M.E.P. in engines. Bending and Shearing of Beams; nature of the stresses. Shear Force diagrams. Rules and examples. Bending diagrams. Rules and examples. Complete S.F. and B.M. diagrams; problems. Moments of Resistance of a Beam. Bending of Beams $\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$ and examples. Eccentric Loading. Short Columns; Application. Hooks, etc. Twisting of shafts. Torsion. Solid and Hollow shafting. Oblique sections. Normal and Tangential stresses. Hydrostatics; Centre of Pressure, etc. Application. Problems of Hydrostatics.

14—HEAT

Sources of Heat: Sun, fuels, electrical, mechanical, chemical. *Heat Transmission*: Elementary notions of conduction, convection, their applications, and radiation. *Effects of Heat*: Expansion of solids, liquids, gases, and their applications. *Atmospheric Pressure*: Weight of air. Measurement of air pressure. *Thermometry*: Unreliability of temperature sense. Construction of mercury thermometers. Upper and lower fixed points. Effect of pressure on boiling. Scales. *Conversion*: Laws of vapourisation and boiling point. Effect of dissolved substance on b. pt. *Co-efficient of expansion*: Comparison of linear expansion of metals. Co-efficient of linear expansion. Superficial and cubical expansion. *Temperature and Amount of Heat*: Difference between temperature and amount of heat, heat capacity. Units. *Water equivalent of Calorimeter*. *Specific heat* of metals. Water equivalent of tanks, boilers, pipes, etc. *Sensible and Latent Heat*: Latent heat of steam. *Melting and Freezing pts.*: Cooling curve for paraffin wax. Latent heat of melting solids. Latent heat of fusion of ice. *Conduction*: Comparison of conductors, insulators, "lagging." Davy safety lamp. *Convection*: Further ideas. Ventilation. Air currents. Thermo-syphon systems. *Radiation*: Comparisons with light: absorption and radiation. Reflection. Thermos flask. *Boyle's Law*: Using J-Tube and Boyle's Law Apparatus. *Charles' Law*: Co-efficient of expansion for air. Other gases. *Absolute temperature*: Volumes at S.T.P., using the gas laws. *Calorific value of Fuel*. *Joule's equivalent*: Heat energy and mechanical energy interchangeable. Work done by expanding gas.

101, 102, 103—ARCHITECTURAL DESIGN I, II, III

The functional planning of simple buildings, including the following general types :

- (i) *Domestic*—houses, flats, hotels.
- (ii) *Educational and Cultural*—schools, libraries, art galleries, museums.
- (iii) *Recreational and Social*—ballrooms, sports clubs and pavilions, parish halls, etc.
- (iv) *Commercial*—shops and showrooms, offices, banks, post offices, restaurants, public-houses.
- (v) *Travel*—rail and bus stations, garages and filling stations.

The fundamental principles of architectural æsthetics.

The major part of the class time will be devoted to the solution of design problems, involving the practical application of the above.

104, 105—ARCHITECTURAL DESIGN IV, V

The principles of functional planning as applied to any of the general types of building encountered in ordinary practice. The planning of highly specialised industrial buildings is specifically excluded.

The principles of architectural æsthetics applied to the design of buildings.

The major part of the class time will be devoted to the solution of design problems, involving the practical application of the above.

106—BUILDING CONSTRUCTION : ELEMENTARY

Introduction : The principal materials used in the construction of a small house—bricks, stone, cement, sand, lime, mortar, concrete, wood, and slates; simple explanation of their composition, properties and uses. The principal elements of a small house—walls and partitions, floors, roofs, doors, windows and stairs. Outline of materials used and of types of construction.

Foundations : Purpose of foundations; “standard” concrete foundation; surface concrete.

Walls and Partitions : Common methods of walling—brick, stone, concrete block and mass concrete; purpose and principles of bonding; brick sizes; common thicknesses of brick walling; brickwork terms; stretcher bond; English and Flemish bond in 9”, 14” and 18” walls, with stopped and toothed ends; garden wall bonds; stone copings; brick jointing and methods of pointing; composition and gauging of mortars; horizontal D.P.C.s near ground level—their purpose and the materials commonly used; half-brick and concrete block partitions; principal characteristics of limestone, sandstone and granite; varieties of rubble and ashlar walling.

Floors : Simple joisted ground floors; wallplates on offsets and sleeper walls; joist sizes; boarding; fender walls and ground floor hearths; flooring round hearths; upper floors in timber; methods of carrying wallplates; joist sizes related to spans; herringbone and solid strutting; upper floor hearths; skirtings; ventilation of floors.

Roof Carpentry : Explanation of terms—pitch, span, rise, eaves, ridge, verge and gable; construction of lean-to, couple and collar braced roofs; treatment at eaves and ridges; lathing, boarding and sarking; king-post truss; ceiling joists.

Roofing : Sizes of slates; slate bonding; lap and gauge; head and centre nailing; treatment at eaves, ridges and verges; pitches of slated roofs.

Roof Drainage : Cast-iron eaves gutters and downpipes—standard sizes, fixing and jointing; hopper heads, swannecks, toes and bends.

Door and Window Opes : Door and window opes in brick walls—with square and rebated jambs; stone and concrete lintels; principle of arch; semi-circular and segmental arches in gauged brick, rough brick and stone; relieving arches; stone cills and thresholds.

Doors : Need for building up doors from small scantlings; framed, braced, ledged and sheeted doors; simple panelled doors moulded in the solid; door frames in walls and partitions, methods of fixing; plain linings and architraves; footblocks; methods of fixing feet of external door frames; saddles.

Windows : Wood casement frames and sashes—outward and inward opening; methods of fixing; simple cased frames and double

hung sashes; relative merits of different types; window boards; linings and architraves.

Wood Partitions: Simple stud partitions with door opes.

107—BUILDING CONSTRUCTION: INTER. I

Foundations: Design of concrete slab foundations to walls and piers in different kinds of soil.

Walling: Composition and properties of cement, limes and sand; gauging, mixing and uses of cement and lime mortars; sand and aggregates—selection, grading and washing; gauging and hand mixing of concrete; setting of concrete; mass concrete and concrete blocks in walls and partitions; use of breeze blocks; bonding brickwork in right-angled bends and junctions; brick corbelling; formation and composition of limestone, sandstone, granite and marble; quarry bed; principles of masonry bonding; surface finishes and labours to masonry; types of jointing in ashlar work; strings and simple cornices in stone; stone quoins; copings in stone and concrete pre-cast and in situ; raking copings, shoulder stones, kneelers and apex stones; joints and fastenings; materials used for D.P.C.s; D.P.C.s in parapets and stacks.

Opes: Flat brick arches; semi-circular, segmental and flat masonry arches; cills and thresholds in stone and concrete—pre-cast and in situ; stone jambs, mullions and transomes; details of door and window opes, embodying these features in conjunction with concrete lintels and rough brick arches.

Structural Steel: R.S. sections; R.S.J. lintels and girders; templates and lead seating; plate and standard connections; bolted and rivetted joints.

Concrete in Floors and Roofs: Concrete ground floors; steel and concrete floors and roofs; screeding to concrete floors.

Timber: Use of hard and soft woods in carpentry and joinery; the common varieties; sizes available; principles of jointing; common joints and typical applications.

Wood Floors and Ceilings: Double floors, embodying R.S.J.s or timber binders; jointing and laying floor-boards on joists and concrete; hearth margins; ventilation of floors; wood and metal lathing to ceilings.

Wood Roofs: Hips and valleys; double roofs with purlins supported from cross partitions; flat roofs; preparation of flat roofs for plumbing; box and taper gutters; cesspools and outlets; trimming to roof lights and stacks; ventilation of roofs.

Roofing: Plain tiles—sizes, laying and bonding, suitable pitches and laps; treatment of slated and tiled roofs at hips and valleys; lead and copper sheet weights and gauges used in roofing, widths and lengths used; jointing and fixing lead and copper sheet; lead and copper flats—drainage and falls; lining box and taper gutters, cesspools and outlets; flashings to stacks and parapets.

Stairs: Straight flight timber stairs with open balustrades and the usual trimmings.

Partitions: Framed and braced partitions; wood and metal lathing to partitions.

Doors: Panelled doors with planted and bolection moulds.

Windows: French casements in wood; solid mullioned, single and double boxed venetian sash frames; metal casements and French doors ("Standard" and "Universal" sections) fixed direct to jambs and in wood frames; ventilating hoppers.

Plasterwork: Preparation of brick, stone and concrete surfaces for internal plastering; rendering, floating and setting on walls and on lathed partitions and ceilings; gauging of several coats; use of hair; plaster of paris; use of gauged plaster.

Painting: Composition of oil paints; preparation of wood and iron surfaces for painting; priming concealed joinery; number of coats; drying and rubbing down; succession of operations.

108—BUILDING CONSTRUCTION: INTER. II

Basements: Waterproofing basements; ventilating underground floors.

Walling: Varieties of Irish bricks available—their characteristics and uses; fireplace opes and flue stacks; elliptical and pointed arches in brick and stone; patent slab partitions; quarrying and cutting building stones; weathering and discoloration of stonework; characteristics of principal Irish building stones and marbles; fixing stonework to steel.

Concrete and Structural Steelwork: Machine mixing of concrete; patent concrete flooring systems; steel roof trusses and purlins; details of "factory" type roofs; fire resistance of buildings and materials; reinforced concrete—methods in common use for beams and floors.

Pavings, and Wall Linings: Brick, concrete and tile paviors; glazed wall tiling; quarry tiles; encaustic tiles; enamel glazed tiles.

Wood: Growth, conversion, seasoning and defects of timber.

Temporary Carpentry: Centres for arches (exclusive of framed centres), fixing and easing; casing for mass concrete walling; moulds for pre-cast concrete work; shuttering for concrete floors and roofs; casings for lintels, beams and columns; erection and removal of concrete formwork.

Wood Floors: Parquet and woodblock floors; matwells.

Wood Roofs and Ceilings: Queen post and composite trusses; pitched roofs over complex plans; roof lights; fibrous plaster slabs in ceilings—sizes, fixing and jointing.

Partitions: Fibrous plaster slabs on partitions.

Roofing: Varieties of slates in general use in Ireland—their characteristics, sizes, covering capacity; composition and manufacture of roofing tiles—clay, concrete and asbestos cement; pantiles and interlocking tiles; torching and rendering; flashing to roof lights; lead covering to wood and stone cornices, etc.; plumbing to pipes passing through roofs; bituminous felt roof coverings, treatment at upstands and cesspools; tarmacadam finishes; asphalt coverings on concrete and wood; corrugated iron and corrugated asbestos-cement roofs; roof pitches for different coverings.

Stairs: Dog-legged and open well wood stairs, with open and solid balustrades; stone stairs—straight flight, dog-legged and open well—with spandril and rectangular steps.

Doors: Flush doors; double margin doors; glazed doors; swing doors; diminished stile doors; garage doors; gates; usual locks and furniture; floor-spring hinges.

Windows: Pivot-hung wood sashes; composite wood windows with mullions and transoms; usual window locks and fastenings (for wood and steel windows); fansash openers.

Screens: Transome and side framing; glazed screens.

Trimmings: Splayed jamb and soffit linings; framed and panelled linings; dado rails and dado panelling; picture rails.

Water Services: Principles of hot water circulation; domestic hot and cold supply; primary and secondary circulations; coal and coke boilers.

Sanitation and Drainage: Domestic sanitary fittings; soil and vent pipes; waste and anti-syphonage pipes—materials, common sizes, fixing and jointing; principles of drainage; sizes of pipes and falls; excavation and boning-in; concrete beds; laying and jointing stone-ware pipes; junctions and manholes; connection to sewer, disconnecting trap; gully traps; ventilation of drains; testing by smoke and water.

Plasterwork: Composition of fibrous plaster slabs; finishing slabbed surfaces; composition of patent plasters and use of hard plasters on walls and ceilings; salient angles, jambs and dadoes; external wall renderings in cement.

Painting: Painting on plastered surfaces; water paints; size; treatment of ceilings.

Glazing: Common varieties and weights of plate and sheet glass used for window, door and skylight glazing; glaziers' putty; glazing wood and steel sashes, with putty and movable beads; patent roof glazing.

109—BUILDING CONSTRUCTION: ADV. I

Foundations: Reinforced concrete slab, pile and raft foundations.

Brickwork and Masonry: Brick footings; reinforced brickwork; cavity and composite walls; brick and tile cornices and corbels. Stone columns, solid and hollow; bases and capitals; built-up cornices, entablatures, pediments; stone chimney stacks, finials, crosses, porch roofs, and tracery windows; stone and marble fireplaces; stone and marble slabbing to brick and concrete walls; adding new work to old; treatment of damp walls.

Concrete and Structural Steelwork: Concrete construction joints; expansion joints in walls, floors and roofs; reinforced concrete-framed buildings, stairs and roof trusses; retaining walls in mass and

reinforced concrete. Steelframe construction; welded structural steel-work; steel stanchions, caps, bases and connections; plated and built-up sections; concrete casing of steel-frame buildings.

Temporary Carpentry: Shoring and underpinning; timber and steel scaffolding; staging; framed centres for arches.

Roofs: Belfast and other forms of open timber roof truss; dormer windows (including plumber's work); steel skylights and lanterns.

Stairs: Planning and construction of geometrical stairs.

Doors: Sliding doors and sliding door gear.

Partitions: Folding and sliding partitions.

Windows: Factory, hospital, and sliding and folding types of metal window; locks and fastenings for metal windows.

Furniture: Presses, lockers, dressers, drawers, and counters.

Water Supply: Wells, pumps and water storage; water softening; water heating by gas and electricity.

Drainage and Sanitation: Cast-iron drains; drains under buildings; inspection shoes and chambers; pumps in drainage schemes; one pipe system; grease traps, septic tanks, chemical closets; asbestos cement, rainwater ware.

Metalwork: Metal cills, linings and architraves; simple gates, railings, grills, balustrades and handrails in wrought-iron, cast-iron and bronze; construction and fixing.

111—SPECIFICATIONS AND MATERIALS

Brickwork and Masonry: Manufacture, characteristics and uses of clay, concrete, sandlime, glass, glazed and fire bricks; practical tests of bricks; varieties and properties of common marbles; cast stone; polished granite and limestone; tests of building stones; decay, preservation, restoration and cleaning of stonework.

Concrete: B.E.S.A. standards; varieties of cement and their uses; white sands; colouring cement finishes; surface finishes to concrete (other than renderings); prevention of cracking and dusting in concrete pavings, surface and integral waterproofing processes.

Pavings, Floorings, Stair Coverings and Wall Linings: Terrazzo and mosaic; stone and marble; rubber sheet, rubber tile, linoleum and cork tile; terracotta and faience.

Timber: Plywood and laminated boards.

Roofing and Roof Plumbing: Glass tiles; manufacture and general uses of lead and copper.

Painting: Properties and uses of the common bases, vehicles, solvents, driers and pigments; matt and gloss finishes; varnishes and enamels; water, oil and spirit stains; french polishing; oil and wax polishing; cellulose and bituminous and metallic paints; spray painting.

Glazing: Composition and manufacture of glass; properties and applications of wirewoven, armourplate, ultravioletray, and safety glass; pavement lights; concrete glazing; lead and copper glazing.

Specification: Simple specifications of the following in small domestic buildings: concrete; brickwork; drainage; masonry; roofing; carpentry and joinery; plaster work; plumbing; glazing; painting.

112, 113, 114—HISTORY OF ARCHITECTURE I, II, III

(a) *Factual*

History of the development of Architecture from the earliest records down to the present day; the historical styles—Egyptian, West Asiatic, Greek, Roman, Byzantine, Romanesque, Gothic, Renaissance, Georgian; nineteenth and twentieth century architecture in Europe and America. Study of historical buildings, illustrating this development, comparison of similar features in different styles and of the solutions of similar problems in different periods.

(b) *Analytical*

Analysis of the development of structure, of the functional plan and of æsthetic expression throughout the historical periods; the interdependence of these developments, the religious, social, political and technical influences that shaped their development; the historical significance of "style"; the causes that led to recurrent periods of greatness and of decadence.

115, 116, 117—FREE DRAWING I, II, III

Drawing of objects, involving a knowledge of the principles of foreshortening displayed in the representation of cylindrical, conical

and rectilinear forms—singly and in combination—in various positions with respect to eye-level. Drawing of common objects, furniture, features of buildings, etc. Pattern drawing on a geometrical basis, with geometrical and free-drawn ornament. Construction of classical and mediæval mouldings and their enrichments. Tracery design. Lettering. Washes in monochrome and colour. Drawing of ornament and architectural details from casts; drawing from the antique. Poster design. Memory drawing. Modelling in clay and making plaster casts. Architectural model-making.

121—MECHANICS: ELEM.

Forces acting on a rigid body; composition and resolution of forces in one plane; equilibrium of forces; triangle and polygon of forces; principle of moments; couples; reactions of beams; centre of gravity; centre of area; simple machines; efficiency of machines.

Laws of motion; force, mass and acceleration; momentum; potential and kinetic energy; work; power. Hydraulic pressure; total pressure on an area; centre of pressure.

124—STRENGTH OF MATERIALS AND THEORY OF STRUCTURES: INTER.

Strength of Materials

Stress and strain; Hooke's law; modulus of elasticity; Poisson's ratio; strain energy; stress-strain diagrams; elastic limit and yield point; effect of repetition and reversal of stress; fatigue of materials; stresses due to dead, live and impulsive loads. Shear stress and strain; shear modulus; graphical and analytical determination of shear in cantilevers and beams.

Theory of bending; neutral axis; internal stresses in beams; graphical and analytical determination of bending moment in cantilevers and beams; moment of resistance; moment of inertia; section modulus; deflection of beams and cantilevers. Short columns; combined bending and direct stress; radius of gyration; critical load for slender columns with axial and eccentric loading. Ultimate strength and working stresses of mild steel, wrought-iron and cast-iron.

Selection of steel and timber sections for stanchions, beams and cantilevers.

Theory of Structures

Stress diagrams for statically-determinate plane frames; deficient, simply firm, and redundant frames; wind pressure on frames; strength of rivetted joints.

Stability of walls; line of thrust and pressure on foundations. Earth pressure; stability of gravity retaining walls.

125—STRUCTURAL ENGINEERING: ADV.

Weights of structural materials; design loads for structures.

Design of

Simple non-rigid structural frames in steel, including rivetted joints and connections. Simple roof trusses in steel. Compound stanchions, beams and cantilevers; plate girders and braced girders in steel. Reinforced concrete columns, rectangular and tee beams and slabs. Gravity retaining walls. Beam foundations; grillage foundations.

126—CONCRETE: PLAIN AND REINFORCED

Materials of concrete. Properties of cement, sand and coarse aggregates. Bulking of sand. Water carried by aggregates. Sieve analysis. Grading of aggregates. Grading aggregates for workability and density. Water. Proportioning. Measuring materials. Mixing. Placing. Curing. Forms. Properties of plain concrete, and effects of proportions of cement and water. Steel for reinforcement. Strength and properties of reinforced concrete. Bond. Stresses in reinforced concrete due to bending. Design of slabs, beams, girders and columns. Design of footings and foundation rafts. Design of reinforced concrete members to resist combined bending and compression. Design of reinforced concrete retaining walls. Design of small reinforced concrete tanks.

127—PHYSICS (HEAT)

Thermometry; quantity of heat; specific heat; latent heat; conduction; convection and radiation; reflection of radiant heat;

thermal conductivity and thermal resistance; thermal resistance of common building materials; air-to-air heat transmission co-efficient; absolute and relative humidity of air; dew point and condensation; expansion of solids, liquids and gases; co-efficients of thermal expansion; gravity circulation in hot-water systems.

128—PHYSICS (ELECTRICITY)

Nature of electric current; conductors and insulators; flow of D.C. in a conducting circuit; voltage, current and resistance; units; Ohm's law; power; kilowatt hour; series and parallel resistances—distribution of voltage, current and power.

Heating effects; electric fires; incandescent lamps; fuses; carrying capacity of cables. Primary and secondary cells; cells in series and parallel.

Magnetic effects; electro-magnet; electric bell, electro-magnetic induction; principle of motor and generator; alternating current; frequencies of commercial supply; principle of transformer, voltage and current ratios; advantages of transmission at high voltage; voltmeters and ammeters.

129—PHYSICS (SOUND)

Nature of sound, propagation; relation between wave-length, velocity and frequency; range of audible frequencies and corresponding wave-lengths; transmission through air and solids; pitch, tone and loudness; harmonics; effect of harmonics on tone; vibrating strings; resonance; organ pipes; absorption, reflection and dispersion, effect of hardness, porosity and roughness of surfaces; echo and reverberation; differential reflection, absorption and transmission of different frequencies; selective absorption of harmonics; "open window" unit of absorption; standing waves and interference phenomena; ratio of acoustic energy to sensation of loudness at different frequencies; unit of "equivalent loudness"—the phon; sound insulation of a wall; the decibel; average sound reduction factor; Sabine's formula; sound shadows.

130—PHYSICS (LIGHT)

Nature of light; propagation; shadows; the "standard candle"; foot-candle, lumen; photometry; "equivalent brightness" **glare**;

reflection and refraction; dispersion; lenses, prisms, plane and parabolic mirrors; the spectrum and the theory of colour.

131—CHEMISTRY

Chemical and physical changes. Compounds and mixtures, chemical affinity, chemical action, catalytic agents. The elements, symbols, metals and non-metals. Solution and suspension, precipitation, distillation, crystallisation. Oxygen, oxides, combustion, oxidation and reduction. Acids, bases and salts. Hydrogen, the chemistry of water. Laws of chemical combination, atoms and molecules, atomic weights. Chemical formulæ and chemical equations; quantitative significance. Chlorine; hydrochloric acid; chlorides. Brief study of other halogens. Nitrogen, ammonia, nitric acid, nitrates, oxides of nitrogen. Sulphur, hydrogen sulphide, oxides of sulphur, sulphurous and sulphuric acid and their salts. Carbon, allotropic forms, oxides of carbon, carbonates. Manufacture of coal-gas. Iron and its oxides, reduction of ores. Calcium and magnesium, their oxides and carbonates, limestone, quicklime, slaking and setting; calcium sulphate, gypsum plasters. Silicon, silica, silicates; aluminium, alumina, aluminates. Sodium and potassium, their oxides and hydroxides. Impurities of natural waters, hard and soft waters, purification and softening of water. The atmosphere, respiration, pollution, acid impurities.

132, 133, 134—SURVEYING AND LEVELLING I, II, III

(a) Chain Surveying

Use of 100 ft. and 66 ft. chain; use of surveyor's tape; ranging a line; ranging past obstacles; chaining on level and sloping ground; fixing points relative to a chain line; selection of stations and survey lines; booking a chain survey; causes of error, precautions, checks; permissible error; plotting the chain survey.

(b) Theodolite Surveying

Construction of the theodolite; temporary and permanent adjustments; reading horizontal and vertical angles; ranging a straight line; triangulation survey; selection of stations; finding the distance between inaccessible points; determination of heights with a theo-

dolite; booking the survey; causes of error, precautions, checks; permissible error; plotting the survey.

(c) *Levelling*

Construction of the surveyor's level; three and four screw levelling plates; the staff; temporary and permanent adjustments; continuous levelling; selection of datum; appropriate lengths of sight; selection of change points; checking by closing circuit; levelling on a steep slope; reading the level of an overhead point; booking and reducing levels by rise-and-fall and by collimation method; causes of error; precautions, checks; permissible error; plotting sections and contours.

(d) *Areas and Volumes*

Calculation of areas; use of planimeter; calculation of earthwork quantities.

(e) *Ordnance Maps*

Scales; use and interpretation of ordnance sheets; conventional signs; ordnance datum; benchmarks; spot levels; contours.

135—PLANE AND SOLID GEOMETRY: ELEM.

Construction and use of scales; plotting of angles by protractor; division of lines in given proportions; measurement of angles in degrees; construction of a triangle from given data; construction of polygons; similar figures; enlarging and reducing figures by radial projection; areas of triangles, polygons and curved figures; construction of circles from specific data; tangents; methods of defining positions in space of points, lines and planes; horizontal and vertical projections; horizontal and vertical traces; inclination of lines and planes to planes of projection; projection of prism, pyramid, regular tetrahedron; sphere; right circular cylinder and cone.

136, 137—PLANE AND SOLID GEOMETRY: INTER. I, II

The ellipse, normals, and tangents; construction of arches and mouldings. Geometric design based on regular polygons; tracery design. Rectangular, oblique and circular surfaces in isometric and oblique projections. Oblique planes and their intersection; bevells for splayed soffits, jamb linings, hoppers, hip and valley roof

members for roofs of regular plan; dihedral angles. Sections of raking mouldings over square plans. Simple problems on the interpenetration of solids, including prism, pyramid, cylinder, cone and sphere. Developments of curved soffits in straight walls, ribs in groins, domes, niches and pendentives. Development of strings of geometrical stairs.

140—PERSPECTIVE AND SCIAGRAPHY

Shadows: Definition of traces of lines. Determining traces of lines in vertical, horizontal and auxiliary planes. Cast shadow of lines on vertical and horizontal planes when given direction of plan and elevation of light ray. Cast shadow of planes, including circular surfaces on horizontal, vertical and auxiliary planes. Cast shadow of solids, including circular solids on horizontal, vertical, auxiliary planes. *Perspective*: Definition of the various terms. Use of parallel, "School of Art," and architectural method. Representing in parallel perspective the following: square, circle and polygonal shape on ground plane and horizontal. Perspective representation by architectural method of geometrical solids. Relation of groups of geometrical solids to outline shape of buildings. Representing to given scale in architectural perspective buildings conforming to simple geometrical solid shapes.

141—BRICKLAYING AND MASONRY: PRACT. (ARCHITECTURE COURSE)

The handling of materials. Bricks of various kinds, limes, cements, and mortars, natural building stones, concrete wall and floor tiles, earthenware pipes. The use of bricklayers' and masons' tools. Simple brick bonding, pointing and jointing. Construction of arches, fire opes and flues, corbels and weatherings. Bonding to opes. Cavity walls. Ashlar and rubble walls, stone cills, thresholds, copings and other dressings. Laying of floor and wall tiles. Laying of drains, construction of manholes.

142—CARPENTRY AND JOINERY: PRACT. (ARCHITECTURE COURSE)

OBJECT: To provide practical instruction in the methods and materials used in construction of the usual pieces of work in carpentry

and joinery. *Method*: Instruction in the making and proportioning of the four fundamental joints leading to group work on the following articles of joinery: Door frame details, simple roof details, including example of hipped roof, panel door construction, sashes and frames (casement and sliding) from prepared material. Simple staircase details.

143—PLUMBING: PRACT. (ARCHITECTURE COURSE)

Roofwork: Exercises in the working of sheet lead. Bossing external and internal corners for gutters; forming lead soakers, lead aprons and back gutters, ridge rolls and cesspool boxes. Setting out single step and herringbone flashing. Roof leadburning by the oxy-acetylene flame. Simple copper roofing joints, rolls, and welts. *Cold Water Supplies and Pipework*: Preparation and soldering of round and branch joints on lead water, waste and soil pipes. Installation of stopcocks, bibcocks, water meters, etc. Bending copper tubing by various workshop methods. *Sanitation*: Cutting, jointing, and erecting cast-iron soil and vent pipes. Installation of W.C. cisterns. Bending lead soil pipes. *Heating and Hot Water Supplies*: Bending wrought iron and mild steel pipe by means of a forge fire. Practical work with the oxy-acetylene welding plant. Cutting, welding and brazing iron and copper tubing. Installation work on full-size hot water systems.

144, 145—DRAUGHTSMANSHIP: PLAN DRAWING I, II

Materials and instruments of draughtsmanship; scales and their application to maps and plans; setting out and presentation of various types of drawings; lettering and dimensioning; conventions of architectural draughtsmanship; orthographic and isometric projection; standard drawing office practice; methods of enlarging, reducing, photo-copying and printing; practice in the preparation of sketch plans and working drawings from rough sketches; tracing in pencil and ink; plotting surveys of lands and buildings.

146—MENSURATION AND TRIGONOMETRY I

Mensuration: Lineal, square and solid measures. The mensuration of lines, such as perimeters and diagonals of common figures. The calculation of areas. The contents of solid bodies. The appli-

cation of the principles of mensuration to problems met with in professional practice, such as rainfall, drainage, ventilation, earthwork and builders' work. *Trigonometry*: The elements of the subject so far as required for simple land surveying. Plane trigonometry applied to the mensuration of heights and distances. The nature and use of the common system of logarithms.

147, 148—BOOK-KEEPING: ELEM. I, II

The meaning and object of book-keeping; single and double entry. Opening entries; cash book, ledger, division into groups of accounts, day book, purchases book, returns books, bill books and journal; posting to the ledger; the trial balance; closing the ledger. The trading account, profit and loss account, and balance sheet; gross and net profits; assets, liabilities and capital. Simple partnership accounts. Income and expenditure accounts. Receipts and payments accounts. Banking; current and deposit accounts; definition and use of cheques, bills of exchange and promissory notes.

149, 150—ECONOMICS I, II

Meaning of the principal economic terms. Causes of differences in productive power. Analysis of various forms of organisation for production. Value in relation to production, exchange, distribution and consumption. The distribution of income between individuals and classes. Causes of variations in wages, profits and interest. The theory of rent. Economic effect of the ordinary actions of government. The nature and functions of money and banks. The determination of price levels and of the relative value of national currencies.

151, 152—LEGAL SUBJECTS I, II

Central Government.—The nature of the Eire Constitution. The position of the President with regard to the executive, the legislature and the judiciary, and the relations of these to each other. The liberty of the subject. Parliament. The composition of the Senate and of the Dail. The Parliamentary session; opening, prorogation, dissolution. Legislative procedure; kinds of Bills and their passage through Parliament. Legislation by Provisional and Statutory Orders. Parliamentary control of taxation; the Budget and Finance

Act. The Executive Council, Ministry and State Council. The more important Government Departments and their principal duties, especially those most affecting the profession of surveyor. The legal system; Common Law, Statute Law and Equity; legal and equitable remedies. The principal courts of record (superior and inferior) and an outline of their civil jurisdiction.

Local Government.—The Local Authorities and their areas; principal powers and duties; bye-laws; methods of acquiring additional powers; chief sources of income. A general knowledge of the administration of the following services and the responsible authorities: public health, highways, town and country planning, housing, small holdings and allotments, land drainage. The supervision and control of Local Government by the State.

Ownership and Possession.—The legal conception of, and distinction between, "ownership" and "possession." The subject matter of ownership; "*res nullius*." Absolute and limited ownership. Possession of land. *Classification of Property.*—The difference between real and personal property. Corporeal and incorporeal hereditaments. *Tenure.*—The historical evolution (in outline) of freehold, copyhold and leasehold. The abolition of copyhold (excluding details relating to the extinguishment of manorial incidents).

Estates and Interests in Land.—The chief characteristics of the following freehold and leasehold estates and interests:—fee simple (absolute), fee tail (including details concerning the mode and effect of barring entails), tenancies for life and for terms of years, with particular attention to the tenant's rights of enjoyment and liability for waste. The meaning of "reversion" and "remainder." The distinguishing characteristics of joint tenancy and tenancy in common.

Transfer of Land.—The nature of the transactions of sale, lease and mortgage (in outline). The object and effect of a strict settlement of land (in outline, and excluding particulars of the vesting of the legal estate and of the detailed provisions of the trust instrument).

Contract.—Nature and formation of contract; contracts under seal and simple contracts; expressed and implied contracts; offer and acceptance; options to purchase; doctrine of consideration; meaning of "void," "voidable" and "unenforceable." Proof of contracts for sale or other disposition of land and for sale of goods; doctrine

of part performance. Contractual capacity of infants and corporations. Nature of "mistake," "fraud" and "misrepresentation"—their effect on a contract; difference between "conditions" and "warranties." Different ways in which a contract may be discharged. Assignment of contract. Remedies for breach of contract. Agency—express, implied and inferred. The agent's authority; ratification; rights and duties between principal and agent; liability of principal and agent to third parties; determination of agency. Master and servant; contractual rights and duties in outline.

Tort.—Nature of and general principles of liability in tort. Definition of and remedies for trespass, dispossession, nuisance (public and private), negligence, fraud and conversion. Liability of an employer for the torts of his servant or an independent contractor; liability of a master for injuries to his servant (in outline). Liability of a principal for the torts of his agent.

153—QUANTITIES: INTER.

Squaring dimensions. Abstracting and working up abstracts. Writing bills of all trades. Measurements and taking-off of dimensions from drawings of earthwork, foundations, drainage, brickwork, slating and roof tiling, carpenter's and joiner's work, founder and smith's work, external plumber's work, plastering, glazing and painting. Proper use of side-casts on waste and their application; a good order of taking dimensions; accuracy in measurement; correct application of mensuration to the measurement of irregular surfaces and bodies; to base their descriptions upon the specification notes given, and to show a general knowledge of constructional detail.

154—QUANTITIES: ADV.

Extension of the syllabus for Quantities (Intermediate) to show a working knowledge of the Standard Method of Measurement and the principles of "taking-off," as indicated therein, in their application to the measurement of all types of building work normally encountered, including temporary work, shoring, site works and demolition.

155—LEGAL SUBJECTS III

Public Health and Local Government Acts.—The Public Health (Ireland) Acts, 1878 to 1919; the Local Government (Ireland) Acts, 1898 to 1919, and the Local Government (Adaptation of Irish Enactments) Order, 1898; the Acquisition of Land (Assessment of Compensation) Act, 1919; the Local Government Acts, 1925 and 1927, 1941 and 1946, in so far as they relate to the following matters :—

Sewerage and drainage; disposal of sewage; privies and water-closets; water supply; nuisances; public roads and streets, including private streets; pleasure grounds; purchase of land, arbitrations and by-laws.

The Housing of the Working Classes (Ireland) Acts, 1890 to 1932. The Labourers (Ireland) Acts, 1883 to 1914. The Housing (Miscellaneous Provisions) Act, 1931, and amending Acts to 1946. Tuberculosis (Establishment of Sanatoria) Act, 1945.

Building Contracts.—Building Contracts generally; their nature, formation and construction. The parties to building contracts and the persons connected therewith. The standard forms of building contract and sub-contract. The rights of building owners, adjoining owners and third parties. The usual procedure in building works. The principal statutes and case law affecting building contracts.

Law of Dilapidations.—The meaning of dilapidations; liability for dilapidations. The meaning of waste; legal and equitable waste; liability for waste. Implied and statutory obligations to repair between landlord and tenant; obligation under express contract; interpretation of covenants to repair; meaning of "fair wear and tear." The effect of assignment of term or reversion upon liability to repair. Liability of executors. Landlord's remedies for breach of covenant to repair; notices to repair; interim schedules; schedules at end of leases; measure of damages. Liability for works required and charges made by local authorities. Dangerous structures. Party-walls. Fences. Liability for injuries to third parties; liability of owner and occupier to persons coming on to the premises, to persons using the highway and to adjoining owners. Statutory provisions and cases of importance to surveyors relating to dilapidations, waste and repair in respect of urban properties.

156—MECHANICAL DRAWING: ELEM.

Use of drawing instruments; division of lines; scales; setting out angles and measurement of angles by protractor; plane rectilinear figures; circles and tangents; construction of geometrical patterns. Principles of projection; orthographic projection; isometric projection; oblique projection; setting up orthographic; isometric and oblique projections from dimensioned sketches or by measurement from simple objects.

157—BRICKLAYING: PRACTICE 1

The tools in common use, the trowel, plumb rule, rule, level, line and pins, etc. Setting bricks to the line. Bonding, rules, English, Flemish and other bonds. Application of the rules of bond in setting out quoins, junctions and jambs. Setting out of footings. Building simple fire opes. Cavity walls and quoins. Setting of the register grate. Laying tile floors, cutting of tiles. Laying and jointing drain pipes in simple runs. Construction and bonding of door and window opes. Setting of lintels and the construction of relieving arches.

158—BRICKLAYING: THEORY AND DRAWING 1

The tools commonly used by the bricklayer, the materials, bricks, sand, lime and cement, types in use and simple tests. Bond, meaning, etc. Bonding of walls and quoins in English, Flemish and other bonds. Purpose of and construction of foundations and footings, their width, depth and width. Damp-proof courses, materials, position and precautions in laying. Cavity walls, use of tie irons, etc., simple fire opes, openings for doors and windows with square and recessed jambs. Drains, pipes and joints. The preparation for and setting of floor tiles. The setting out and construction of relieving arches.

159—BRICKLAYING: PRACTICE 2

Bonding and building quoins, junctions and breaks in various bonds. Bonding cavity walls, treatment at base, top and at jambs and heads of opes. Placing of vertical and horizontal damp-proof courses. Setting of cills and spud stones. Building of opes with square and recessed jambs. Construction and setting of square, segmental and semi-circular arches. Building of inspection chambers.

160—BRICKLAYING: THEORY AND DRAWING 2

Special cutting tools used by the bricklayer. Outlines of the manufacture of limes, cement and bricks. Bonding of walls, quoins, junctions, breaks and piers in the various bonds. Jointing and pointing brickwork. Footings to walls, quoins and breaks with walls of various thicknesses. Damp-proof courses and vents under floors. Openings in walls to maintain bond, broken bond. Cills and lintels of stone and concrete. Drains, gullies and intercepting traps, gradients and inspection chambers. The square, segmental and semi-circular axed arches, skewbacks, summering points and methods of setting out.

161—BRICKLAYING: PRACTICE 3

Bonding and building in any bond; square and splay quoins; breaks, pilasters and plinths. Setting out, cutting and building moulded segmental and gothic arches in opes with recessed and splay jambs. Preparing for and setting open and close ranges, principles of setting, etc. Walls of bricks and concrete blocks. Wall tiling.

162—BRICKLAYING: THEORY AND DRAWING 3

General bonding practice to include isolated and attached piers, square and splay quoins in any bond. Moulded segmental arches, mitres, stops, etc. Gothic arches, methods of setting out, treatment of the joints, cills and heads of the opes. Opes with square, recessed and splayed jambs. Cavity construction; concrete ingredients and proportions; concrete blocks; cills and lintels; casting and setting. Drains; intercepting chambers and cascades.

163—BRICKLAYING: PRACTICE 4

Bonding and building more advanced examples of brickwork. Setting out, cutting and building bulls-eye, ellipse and trumpet arches; arches of double curvature. The niche for plastering; the gauged niche, corbels and weathering of offsets.

164—BRICKLAYING: THEORY AND DRAWING 4

General bonding, more advanced examples in any bond. Setting out of ellipse and other arches. Arches of double curvature. The niche hood, gauged and for plastering. Shoring and underpinning.

Drains, septic tanks, etc. Foundations in various soils; damp-proofing in waterlogged soil.

165—CARPENTRY AND JOINERY: PRACTICE—INTRO.
COACHBUILDING: PRACTICE—INTRO.

Use of jack plane and gauge in reducing wood to a width and thickness. Use of tenon saw and firmer chisel to cut and fit housing joint. Application of housing joint to an internal door frame (group work). Cross halving and T halving joints. Application of halving to simple framing (group work). Common mortise and tenon joint. Application of mortise and tenon to simple framing (group work). Haunched mortise and tenon. Application of haunched mortise and tenon to small-panelled door (group work). Application of mortise and tenon in making and proportioning carpentry joints such as: tusk tenon, partition joints.

166—WORKSHOP DRAWING

Use of instruments: Set square and T square. Angles: definitions and simple constructions. Lettering. Triangles: definitions and constructions. Construction and division of angles. Quadrilaterals: definition and simple constructions. Division of lines. Construction of scales. Application of scales. Use of protractor. Polygons: definition and construction, using set squares. Polygons: construction, using protractor. The circle: definition and properties, constructions. Patterns based on straight line and circle. Oblique drawing. Orthographic projection: prisms, cylinder, cone, pyramid. Translation from oblique to orthographic views and *vice versa*. Development of prisms: application. Development of cylinder: application. Projections of woodworking joints.

167—CARPENTRY AND JOINERY: PRACTICE 1

Revision of common and haunched mortise and tenon joints. Application of angular and dovetail-halving joints. Mortise and tenon joint with high and low shoulder (without moulding). Application of above joint. Mortise and tenon joint with high and low shoulder (with moulding). Application of mortise and tenon joint, including use of rebate and moulding planes. Barefaced double

tenon joint. Application of above in group work—framed and sheeted door. Setting out rods, etc., for double hung sliding sashes. Setting out prepared material for above. Joint between pulley-stile and sill. Joint between pulley-stile and head; cutting out pockets. Joint between bottom rail and stile of bottom sash. Joints at meeting rails. Glazing bar joints. Joints between top rail and stile; moulding horns.

168—CARPENTRY AND JOINERY: THEORY AND DRAWING 1

Timber: growth, structure, conversion, seasoning, diseases and defects. Mouldings and their application in architraves, cornices, skirtings, etc. Construction and use of scales. Panelled doors and door frames; inward and outward opening casement windows; vertically sliding sashes in cased frames; hanging, fitting and hingeing of doors and sashes; door and window trimmings. Joisted floors: construction and listing of materials. Carpentry and joinery joints. Setting out of arches. Simple roofs; ridge and eaves details. Moulds for concrete cills; simple forms of turning pieces, rib and built-up centres. Straight-flight stairs; details of simple curved steps. Glossary of technical terms used in carpentry and joinery work.

169—CARPENTRY AND JOINERY: PRACTICE 2

General revision. Double mortise and tenon joint. Construction of plain and moulded internal panel doors. Carpentry details; centring. Segmental single rib centre. Built-up segmental centre. Built-up gothic centre. Tusk tenon joint. Stopped housed dovetail joint. Application of above two joints—trimming around fireplace. Joint between door-frame stile and lintel, using prepared moulded and rebated material. Dovetail key joint. Application of above in joint of sills in bay window.

170—CARPENTRY AND JOINERY: THEORY AND DRAWING 2

Further details of casement windows and vertically sliding sashes in cased frames. Types of panelled doors; marking of tenons and listing of material; framed, braced and sheeted doors; flush doors. Further details of fixing, fitting and trimmings to internal and

external doors. Further details of single floors; trimming for openings and hearths. Development of roof surfaces; bevels for rafters, hips and purlins. Details of eaves and gutters; king-post and queen-post trusses. Construction, striking and easing of built-up centres. Moulds for concrete stair steps and window sills; formwork for simple panelled concrete work. Simple timbering to excavations; simple shores. Enlarging and diminishing of mouldings; intersection of raking and horizontal mouldings; intersection of straight and curved mouldings on plan. Bevels for splayed jamb linings and soffits. Pivot hung sashes. Construction and setting out of stairs; simple handrail, easings, ramps and quadrants. Glossary of technical terms used in carpentry and joinery work.

171—CARPENTRY AND JOINERY: PRACTICE 3

Setting out and construction of:—Triangular louvre frame; circular-headed door-frame, embodying hammer-head key joint and handrail bolt joint; straight-flight stairs with close string; glazed door with gunstock stile; solid, moulded, curved door head; scale model of king-post truss.

172—CARPENTRY AND JOINERY: THEORY AND DRAWING 3

Further details of pivot-hung sashes; Yorkshire light; hospital sashes; circular-headed door and frame; sliding gates with wicket door; vestibule screen with double swing doors. Further details of single and double floors. Development of irregular roof surfaces; bevels for rafters, hips and purlins; open timbered roof trusses. Further details of eaves and gutters. Framed partitions. Built-up and framed centres. Further details of timbering to excavations. Scaffolding and staging. Further details of concrete formwork. Development and bevels for circular and triangular louvre frame; development and bevels for splayed jamb linings with circular head. Enlarging and diminishing, raking and sprung mouldings. Semi-circular head, circular on plan—parallel and radiating jambs. Flying and raking shores. Construction and setting out of dog-leg and open newel stairs. Details of curved steps; simple problems in hand-railing. Curved ribs for niches and domes. Glossary of technical terms.

173—CARPENTRY AND JOINERY: PRACTICE 4

Setting out and construction of:—Stairs with quarter space of winders; hipped roof; moulds for concrete cills; shoring; church seats.

174—CARPENTRY AND JOINERY: THEORY AND DRAWING 4

Vestibule screen with circular-headed fan-sash; fully-trimmed cased window; venetian window; solid, single-boxed and double-boxed mullions. Folding screens. Roof lights and lantern lights. Composite floors—single, double and framed. Belfast, bow-string, hammer-beam and open timbered trusses. Further roof developments. Ribs for niches. Further problems in shoring; staging and scaffolding for heavy work; timbering to all types of excavation; framed and trussed centres. Construction of spectator's stand. Further problems in the intersection of mouldings. Work of complex curvature. Concrete formwork to stairs and to junction of R.C. column and floor beams. Development of ribs for pendentive. Framed and trussed partitions. Air-tight show-cases; bank counter and fittings. Shop front details; church fittings. Advanced stair work; geometrical handrailing.

175—WOODCUTTING MACHINISTS' WORK:
PRACTICE 1

Safety precautions. Mortising, chain and chisel sharpening. Jig sawing, circular saw sharpening and setting. Lubricating machines and motors. Jig sawing, band sawing, band-saw brazing, simple turning. Jointing sandpaper belts. Cutter grinding for simple mouldings. Breaking out for small work. Belt jointing and tension. Planing and thicknessing.

176—WOODCUTTING MACHINISTS' WORK:
THEORY AND DRAWING 1

Drawing instruments and their uses. Chain and hollow mortise chisel. Jigs for splay mortise. Care of mortise machine tools. Pitch of chain teeth and sharpening. Lubrication of machines and motors. Mouldings in common use. Sawing. Safety methods and precautions. The packing of circular saws, lead, etc. Various types of

saws and their use. Grading timber for common use. Timber calculations. Planing machine heads and parts. Growth of trees. Band-saw guides, thrust wheel and tension. Simple speed calculations. Construction of simple doors. Joints used in woodwork. Jigs for splay sawing. Sash stock drawing. Window stock drawing. The lathe and its component parts. Geometrical drawing of simple mouldings. Scales.

177—WOODCUTTING MACHINISTS' WORK:
PRACTICE 2

Advanced sawing and breaking out. Planing machine cutter grinding and setting. Feed and tension adjustment. Spindling, simple moulding, rebating and grooving. Cutter grinding, turning. Jig sawing and band sawing. Tenoning and scribing. Setting out.

178, 180—WOODCUTTING MACHINISTS' WORK:
THEORY AND DRAWING 2, 3

Drawing of heads for vertical spindle. Drawing of simple forms of framing. Cutting angles and bevells of cutters. The circular saw and the forces operating on it when in motion. Gulleting, tensioning of saws, pitch and cutting angles for various timbers. Double scribing and tenoning. The action of the feed rollers, pressure bars and tension springs on planing machine. The cutting angles of the french head, square block and collars. Drawing geometrical mouldings. The four-cutting machine and multiple mouldings from the solid. Timber calculations. Speed calculations. The box window. Casement windows. The construction of flush doors. Construction of frame and sheeted doors. Diminishing and enlarging of mouldings. Twin tenoning, etc., on tenoning machine. Speeds for machines, rates of speed and the effect of finish. Flooring suitable for secret nailing. Column casing and joints. Grading hardwood and soft woods. Growth and structure of trees.

179—WOODCUTTING MACHINISTS' WORK:
PRACTICE 3

Cutter grinding for square block setting out. Advanced work on lathe. Tenoning and double scribing. Jig sawing and moulding tracery panels. The setting and grinding of spur and adze cutters

for tenoning machine. Advanced spindle work; french head, square block and collars. Preparation of jigs and templates.

181—WOODCUTTING MACHINISTS' WORK:

PRACTICE 4

Preparation of jigs and templates for curved work. Handrails, ramps, etc. Cutter grinding, setting out. Moulding intricate work on vertical spindle. Advanced turning. Advanced sawing, brazing, planing and thicknessing. Curved work on the "Dumpling" block. Moulding cornices, skirting and architraves.

182—WOODCUTTING MACHINISTS' WORK:

THEORY AND DRAWING 4

Planning the machine shop. "Static" and "dynamic" balance. Profile for square head cutters. Preparation of formers for circular work. The ring fence and the principles involved for successful operation. Scale for square block. The construction of stairs. Working handrails, ramps, easings, etc., on the dumpling block. The "burnisher" and the sharpening of french head cutters. Construction of storm-proof windows and doors. Panel moulding and the intersection of cover mould skirting and cornice. Setting out spiral turnings. Moulding circular columns. Grinding chamfer cutters. Church and school joinery. Workshop calculations. Structure and characteristics of timber. Seasoning timber. Plan reading. Pulley calculations. The easing of large mouldings for spindle. Folding screens. Doors and frames (advanced). Windows (advanced). Office furniture.

183—PLUMBING: PRACTICE 1

Setting out and preparing sheet lead, bossing of corners and breaks up to 4" high. Sheet lead bossing of roll ends, welts, and other simple roof details. Preparation of lead pipe for wiping of soldered joints in an underhand, branch, upright and flange position on water and waste pipes up to 2" diameter. Wiping of soldered joints on lead pipes up to 1" in diameter with and without the use of a blow-lamp. Tinning of plumber's brasswork by means of a copper bit. Bending of lead pipes up to 1½" diameter by means of sand, spring, bobbins, or other workshop methods. Bossing of knuckle bends

on pipes up to 1½" diameter. Bending of ½" and ¾" light gauge copper tube to form simple bends and offsets by means of sand, spring, or machine. Jointing of ½" and ¾" light gauge copper tube by means of compression or capillary couplings. Re-washing and adjusting of bibcocks, ball-valves, and similar appliances.

184—PLUMBING: THEORY AND DRAWING 1

Metals used in plumbing: lead, copper, zinc, iron, tin, etc. Purposes for which they are used. Specific gravities, melting points, chief ores. Alloys—hard and soft. Properties, composition, preparation, and making of solders for various purposes. Purification of solder. Brass and gunmetal fittings. Fluxes for soldering lead, copper, zinc, tin, iron, etc. Lead—chief ores; mining and smelting; pig lead; chemical lead. Manufacture of lead water and waste pipes; weights, lengths, and diameters. Manufacture of milled and cast-sheet lead; advantages; weights and thicknesses. Physical properties and applications of lead; lead oxides; red and white lead. Copper; chief ores; physical properties. Manufacture of copper tube, gauges, lengths and diameters. Manufacture of sheet copper. Hot rolled copper for roofwork; gauges and weights. Physical properties and uses of zinc, tin, and other metals for use in plumbing work. Soldered joints for connecting lead pipes. Round, branch, flange, taft, and other wiped soldered joints. Wiped soldered seams on lead-lined tanks and cisterns; soldered cracks in gutters. Joints for light gauge copper tube. Compression joints. Screwed and sweated joints for heavy gauge copper tube. Capillary joints for light gauge copper tube. Bending and jointing copper tubes. Couplings, sockets, tees, etc., for connecting wrought-iron or mild steel pipe. Cutting, bending, and jointing wrought-iron, gas, water, and steam tube. Joints for cast-iron soil and cast-iron or steel water pipes. Cutting and jointing cast-iron pipes. Cements used by plumbers—Portland cement, Keene's cement, Plaster-of-Paris, etc. Plug and full-way valves; pillar and bibcocks; globe cocks for use on water and gas supply mains. Calculations of sizes and weights of sheets and pipes of various metals. Calculations involving capacities of tanks, cylinders, pipes, etc. Areas and volumes of spheres, cones, etc. Simple plans, sections, and elevations of plumbing works and appliances.

185—PLUMBING: PRACTICE 2

Bossing of breaks and corners in sheet lead up to 4" high. Bossing and dressing of steps, rolls, single and double welts, aprons, flashings, soakers, and saddles. Bending light and heavy gauge copper tube up to 1" diameter by means of sand, spring or machine, to form simple bends and offsets. Bending of 2" diameter lead water and waste pipes by different workshop methods. Preparation, fixing, and wiping of soldered joints on lead pipes up to and including 2" diameter. Bossing of lead waste pipe up to 2" diameter to form knuckle bends. Bending of wrought-iron steam tube up to 1" diameter by the use of a forge fire or other workshop method, to form simple bends. Setting out and jointing of hot rolled sheet copper to form simple single and double welts, rolls, drips, and standing seams. Lead burning. Connecting up and regulating of a modern high pressure oxy-acetylene lead-burning plant. Preparation and burning of flat lap or butt joints up to 18" long on sheet lead. Installation of copper and lead water supply pipes, involving the use of couplings, holderbats, soldered joints, pipe hooks and clips, etc. Cutting and screwing of copper and iron pipes up to 1" diameter. Installation of boiler and cylinder couplings, dip pipes, tank connections, etc. Simple leading and jointing of cast-iron soil pipes.

186—PLUMBING: THEORY AND DRAWING 2

Hard and soft waters; effects on pipes and fitting. Water supply for domestic use; supply pipes from main to house, street, ferrule, and stopcock. Pipes for water supply; advantages and disadvantages of lead and copper pipe for underground and overground use. Frost bursts; maximum density of water; precautions to be taken. Ball-valves; high and low pressure valves; Croydon and Portsmouth patterns. Equilibrium ball-valves for very high pressures; types of copper floats. Corrosion of pipes; protection by painting, galvanising, bower-barffing. Dr. Angus Smith's solution; vitreous enamelling. Electrolysis of metals; effects on plumbing work. Roof leadwork; preparation for lead; single and double welt joints, steps, drips, rolls, secret tacks, and soldered dots. Expansion and contraction of lead gutters. Parapet and valley gutters. Capillary attraction in roof-work. Tools for sheet leadwork—their use and care. Weights and

sizes of sheet lead. Roof copperwork; preparation required for laying sheet copper. Single and double welt joints; standing seams and drip edges; gauges and weights. Tools and appliances used for copper roofwork. Flashing of chimneys. Roofwork calculations. Leadburning—advantages over soldering; oxy-acetylene plant. Seams and joints used in leadburning on pipes and sheets. Domestic hot water systems. "Rolyat" and other patented systems. Circulation of water when heated. Conduction, convection, and radiation. Collapse of cylinders; use of dip pipes, drain cocks, etc. Measurement of heat; thermometers; British thermal unit; latent and specific heat. House drainage; materials used. Setting and jointing of iron or stoneware drains, foundations, and gradients. Connection to soil and vent pipes. Traps and appliances, armstrongs, etc. W.C. cisterns; bell and valve syphon patterns. Baths, basins, sinks, water closets, and other sanitary appliances. Meters, valves, etc., used on gas supply systems.

187—PLUMBING: PRACTICE 3

Setting out sheet lead and bossing internal and external corners up to 5" in height. Lining small cisterns and cesspool boxes. Wiping angle seams. Bossing of difficult rolls, saddles, gutter ends, etc. Wiping soldered joints in normal positions on lead pipes up to 3½" diameter. Wiping brass ferrules and thimbles on soil and waste pipes. Bending by means of bobbins, dummies, etc., pipe up to 3½" diameter. Bossing of knuckle bends on lead soil pipe. Lead-burning of simple flat and sloping butt or lap joints. Lead-burned patches, etc. Burned joints on lead waste, soil, and water pipes. Jointing of brasswork to lead pipes by leadburning. Cutting, screwing, and jointing of 1½" wrought-iron pipe. Cutting, screwing, sweating and jointing of heavy gauge copper pipe up to 1¼" diameter. Bending of wrought-iron steam tube up to 1½" diameter by forge fire or other workshop method. Bending of light or heavy gauge copper pipe to form angles, offsets, etc. Welding of wrought-iron or mild steel tubing by oxy-acetylene flame. Welding of butt and branch joints in normal positions on pipes up to 1½" diameter. Bronze welding and brazing of copper pipes up to 1¼" diameter. Setting out and construction of sheet copper back gutters, aprons,

flashings, soakers, rolls, clinks, and gusset pieces. Cutting and jointing of cast-iron soil and vent pipes in all normal positions. Erection of W.C. cisterns, tanks, etc.

188—PLUMBING: THEORY AND DRAWING 3

Pumps. Principles underlying use. Atmospheric pressure. Jack or suction pumps. Bucket and clack valves. Lift and force pumps. Air vessels and rising mains. Suction pipes and retaining valves. Calculations in pumpwork. Defects in pumps; leaking clock leathers, suction pipes, burst air vessels, etc. Installation of simple suction pump, and of lift and force pump. Rotary and semi-rotary pump. Centrifugal pumps. Hydraulic rams. Dash and delivery valves. Shift valve. Adjustment and regulation. Installation of hydraulic ram. Ratio of drive to delivery pipe, etc. Calculations. The lever; orders of the lever; plumbing applications; safety valves, etc.; pulley blocks. Roof leadwork; covering of lead flats; bays, etc. Dormer windows flashed with sheet lead; inverted dormers, etc. Single step and herringbone flashing; secret gutters and cesspool boxes. Sheet copperwork on roofs. Sketches and details of back gutters, aprons, etc. Covering difficult roof sections with sheet copper. Roof calculations. Cold water supply for industrial and domestic use. Water softening plants. Storage tanks. Underground mains. Effects of different soil on copper and lead pipes. Noises and air traps in water pipes. Water hammer. Water meters; Venturi meters; reading of meters. Flow of water, friction, etc. Water leakage and how traced. Calculations in hydraulics and hydrostatics. Hot water supply. Arrangement of boilers and cylinders. Protection of flow and return pipes. Safety valves. Indirect hot water systems. Combined heating and hot water supply systems. Calorifiers. Calculations involving B.T.U.s Boiler ratings, etc. Electrical immersion heaters; installation; thermostats; insulation of cylinders. Gas water heaters; installation; flue pipes, baffles, etc. Comparison of gas and electric water heaters. Drainage and sanitation. Arrangement and fitting of baths, sinks, showers, wash-basins, W.C.s. Urinals; wall and floor type; bidets; drinking fountains. Flushing valves for W.C. pans. Welding and brazing; oxy-acetylene plants; blowpipes and

regulators; correct welding flames; safety precautions. Preparations necessary for welding or brazing water, waste and soil pipes. electric-arc welding.

189—PLUMBING: PRACTICE 4

Bossing sheet lead to form all kinds of corners, breaks, drips, saddles, cesspool boxes, etc., up to 6" high. Preparation, fixing, and wiping of soldered joints on lead pipe up to 4" diameter. Joints to be wiped in all normal positions. Preparation and wiping of soldered seams, flanges, and angles in cisterns, cesspool boxes, etc. Preparation and leadburning of horizontal and upright seams on sheet lead with butt or lap joints. Leadburning of tees, elbows, cup, and other joints on lead waste and soil pipes. Welding wrought-iron or mild steel pipe with the oxy-acetylene flame. Formation of butt, flange, and branch joints, etc. Cutting openings for branches, etc. Use of oxy-acetylene cutter. Brazing and bronze welding of copper tube up to 3" diameter, to form cup, saddle, and slip joints, etc. Bending of wrought-iron or mild steel pipe up to 2" diameter by means of forge fire, etc. Bending of copper pipe up to 2" diameter by the usual workshop methods. Erecting of soil and vent pipe layouts, involving exercises in cutting and jointing cast-iron heavy-coated pipe. Exercises in sheet copper, involving the use of standing seams, clinks, rolls, drips, gutters, aprons, etc. Clinks and joints used on sheet zinc.

As far as possible, the above exercises will be carried out under the same conditions as would exist on an actual job, so as to give the student a practical knowledge of the working methods adopted.

190—PLUMBING: THEORY AND DRAWING 4

Sanitation and drainage. Fixing soil, waste, and anti-syphon pipes on the one and two pipe systems. Venting. Soil and waste pipe layout for large buildings. Local bye-laws. Testing drains by smoke, water, and chemicals. Small sewage disposal plants for country houses. Simple pervious and impervious cesspools. Septic tanks; working principles; anaerobic and aerobic bacterial action; construction of small tanks, filter beds, etc.; scum boards; disposal of both wastes in septic tank systems. Hot water supply. Electrical

water storage heaters. Calculations for steam-heated calorifiers for hot water supply. Hot water pipe-line layouts. Cold water supply. Properties of waters from wells and springs. Storage, filtration and distribution. Pollution of water. Consumption of water per head. Cold water systems for buildings; pipe sizes. Simple systems of fire prevention with sprinklers. Low pressure hot water heating systems. Heating boilers and simple heating circuits, expansion tanks, radiators, air cocks. Single and double pipe ring main hot water heating circuits. Single and double pipe-riser systems. Drop-feed systems. Accelerated systems. Low pressure heating plants. Calculation of heat loss through walls, etc. Air changes and infiltration. "Circuit height" of system. Index radiator. Simple pipe sizing. Taking off quantities for small heating system from plans. Plan reading. Installation and lining up of circulating pumps and accelerators. High pressure hot water heating systems (Perkins). Pumping valves. Pumping through system. Steam-heating systems; low pressure plants; layout of steam and condense lines. Steam traps. Exhaust steam and its use in heating plants. Mountings for steam and hot water boilers; feed pumps, automatic feeds, lifting traps. Fusible plugs; low-water alarms, etc.; priming and foaming in steam boilers. Roofwork. Covering of domes, turrets, and flats with sheet lead or copper. Specifications and quantities for roofwork; simple estimating. Gas fitting. Installation details of coal gas and acetylene gas lighting and heating systems; holders, governors, and pressure gauges, etc.

191—PLUMBING: PRACTICE 5

The work in this section will be so arranged as to allow the student to concentrate on branches of the trade, in which he may not get sufficient training in his daily work. It will, in general, be a revision of the work of former years, but of a more advanced nature. It will also give the student an opportunity to keep up with modern trade trends, especially those dealing with the use and application of new materials as they come on the market.

192—PLUMBING: THEORY AND DRAWING 5

Water supply; artesian wells and boreholes; pumping appliances

in use. Automatic electric pumps; air-lift pumps and compressors. Testing water supplies for human consumption. Taking of water samples. Water softening and purification plants for large buildings; chlorination plants. Calculations dealing with storage and distribution of water. Drainage; soil and rainwater drains; storm overflows, etc. Drainage layouts for various types of buildings; reading of plans. Sewage lifting plants; air compressors; electrical sewage pumps; Adams' sewage lift. Testing and inspection of drainage systems. Writing reports on same. Hot water supply. Plant required for supply of large volumes of hot water, involving use of calorifiers and water heaters. District hot water supply. Hot water heating systems for large buildings. General details of modern pipe layouts and fittings, including automatic thermostatic control appliances. Solid and oil fuel boilers for hot water and steam-heating systems. Vertical, Lancashire, Cornish, water tube and waste heat type boilers. Automatic stokers. Installation of stokers, fans, worms, etc. Gravity feed magazine boilers. Chimneys. Natural, forced, and induced draught on heating boilers. Oil-fired boilers. Construction and lining of combustion chambers. Burners for oil fuel; automatic cut-out; oil feed pipelines; storage tanks. Electrode boilers and electrical thermal storage heating plants. Gas-fired boilers for central heating plants; governors, bafflers, flues, etc. Applications of wall, floor, and ceiling panel, heating systems. Unit heaters. Vacuum steam-heating systems; vacuum pumps. Steam sterilising equipment for hospitals, etc. Motorised and magnetic valves for heating plants. Air-conditioning plants; air washers and humidifiers, heater batteries, etc. Plenum ventilating and heating plants; textile and oil filters for air. Simple air-conditioning plants for cinemas, etc. Steam-cooking appliances. Connection of steam and condense lines, traps, etc. Specifications and plans for plumbing work. General calculations.

193, 194—PLASTERING: PRACTICE AND THEORY 1

Uses of hawk, plastering trowel, handfloat, gauging trowel, margin trowel, lath hammer, level, plumb and bob, plumbing rule, reel and line, joint rules and small tools, stockbrush, scratcher and dasher. Use of hawk and trowel and dasher on first, or scudding

coat. Plumbing and ranging and forming screeds on short and low walls, with plumb rule and bob. Plumbing and ranging, hanging line and bob for high and long walls, fixing the dots. Applying the second or floating coat; use of floating rules. Finishing of skimming coat of lime, putty, and plaster of Paris. Mortars: Coarse and fine; wall and ceiling mortars; use of hair in mortar. Proportions of lime, putty and sand in the different mortars. Limes: Lump lime, hydrated lime, slaking lump lime. Lathing: Method of fixing laths, hand-split and sawn; different classes of laths, lathing on flat and circular partitions and ceilings. Expanded metal lathings, hyrib, for internal and external plastering. Patent plasters, their under coats and finishing coats. Floating and finishing external angle staffs in Keene's cement or hardwall plaster. Floating and finishing breaks to chimney breasts; squaring in for floating and finishing piers. Making of simple running moulds, and setting out same. Building up the moulds; running the moulding on the bench and in situ. Mitreing mouldings; use of joint rules and small tools. Setting out, running and moulding and forming simple panels in plaster of paris. Fibrous plaster slabs: (a) plain finished, (b) rough for skimming. Setting out reverse cornice moulds. Running reverse cornice moulds. Casting from reverse moulds. Making a casting mould for the original cornice. Fixing fibrous plaster cornices and wadding the mitres and joints. Running cornice "in situ"; forming the screeds fixing the rules. Circular mouldings run with a radius on bench. Levelling ceilings: (a) flat. (b) with beams. Plumbing and ranging beams forming the soffit. Running bead moulding on beams. Gelatine moulds.

195—PLASTERING: PRACTICE AND THEORY 2

Nature of sand. Ferric hydroxide in sand. Other impurities. Simple tests. Lime: Lump lime, hydrated lime, slaking lump and hydrated lime. The proportions of lime, putty and sand in wall mortars. The addition of hair in ceiling mortar to be used in lath work. Expanded metal lathing to beams; concave and convex surfaces; fixing to wood joists and steel furring. Finishing in greycoating, and substitutes for greycoating. Plumbing and ranging walls for sunk panels. Running parting beads and skirting mouldings. Floating and finishing walls. (a) ordinary 3-coat work, (b) finishing

in Keene's cement, (c) hardwall plaster, (d) for immediate use. Assembling running rules and fixing for patent cement reveals. Moulded sunk panels to beams with plain band on outside. Running a moulding of a staff bead or ovolo. Moulding on angles to reveals of windows or other openings. Bullnosed or chamfered angles, hand or mould methods. Running cornices in situ; forming the screeds and fixing the running rules; fixing enrichments. Moulding and casting enrichments in wax. Moulding and casting enrichments in gelatine moulds. Different kinds of enrichments fixed in cornices. Reverse cornice moulds; method of forming, and casting from. Making a casting from the original mould, and forming bed for enrichments. Wet and dry or pebble dashing. Materials for ground work and finishing. Running cornice or moulding for external work on brick or concrete core. Fixing the nib and running rules. Forming quoins, plain, moulded, and chamfered. Forming sinking: (a) by the runs or mould method; (b) with sinking rules. Segment and semi-circular arches. Plain arris or moulded. Finding the centre. Forming the screed. Fixing the mould. Moulded soffits to segments and semi-circular arches, sunk and raised. Mouldings run on concave or convex templates or drum. Elliptical moulding run on template or rib. Running base and cap moulding. Square and circular. Piece moulding, caps and bases. Waste mouldings from clay models. Moulding acanthus leaf or similar ornament in wax from plaster-cast. Setting out panel ceilings to be formed in fibrous plaster. Fixing wadding, and stopping fibrous plaster ornamental ceilings.

196, 197—PLASTERING: PRACTICE AND THEORY 3. 4.

Defective plaster work and efflorescence in white cements. Raised panels. Thickness rules. Floating the panels. Sunk panels, or raised margins. Panel ceilings. Panel mouldings for ceilings and walls. Fixing fibrous plaster and panel mouldings. Panel mouldings with circular angles. Fixing circular pieces. Setting out elliptical panels. Arches: Segmental, semi-circular, elliptical, Gothic, Tudor elliptical. Running architraves. Plain and moulded soffits. Moulding and casting. Types of moulds, solid and skin. Jelly moulds, plaster and piece moulds, wax moulds, cutting and horsing up loose piece moulds. Template and pin moulds, for running elliptical arch

mouldings. Forming and plaster piece moulding balusters. Hinged running moulds for diminished models. Forming pediments. Pitch of pediments. Setting out and cutting raking mould. Forming niches by running and casting moulds. Five orders of architecture: Tuscan, Doric, Ionic, Corinthian, Composite. Plastering plain diminished columns. Plumbing the dots. Fixing the collars. Entasis: Diminished floating rules. Constructing diminished fluted columns by the rim and collar method. Constructing pilasters: plain and fluted. Reverse casting moulds for plain columns. Set out and construct: Corinthian entablature. Forming the modillion and other enrichments. Setting out and forming triglyphs. Forming key stones and trusses; plain and decorative.

198—FREE DRAWING

1. Free drawn simple letter forms, single stroke and sans serif Roman and Gaelic types as well as manuscript pen lettering (capitals and lower case). Practice in layout of worded message and simple posters.
2. Elementary perspective of the cube and cylinder and its application to representational drawing of objects based on these forms:—Representational drawing (including object and memory, figure drawing and drawing from natural forms) in various media, pencil, charcoal, pen and ink. Drawing from antique casts—historic ornament, various parts of human form and animal forms.
3. The standard primary colours and neutrals—harmonious colour combinations—application to pattern and poster work.
4. Border and all over patterns based on repeated units as letters and numerals, geometrical and cut out shapes, etc.
5. Water colour sketching.

199—PAINTING AND DECORATING: PRACTICE 1

Setting out drawing-board equipment and instruments. Drawing block capitals and lower case. Preparation of undercoatings for plain painting. Fillings and undercoatings. Block type letters thickened and shaded in two colourings. Elementary brushwork practice. Plain painting. Simple mixing in oil and flat tints. Care of tools

and brushes. Setting out and preparing for standard proportioned Roman capitals and lower case. Plain painting in distemper tints of two or more geometrical figures. Colour contrasts. Thickness and shadings for modern Roman capitals. Brushwork for co-ordination of hand and eye. Setting out simple workshop measurements of panels for cutting-in brush exercises. Setting out standard numerals in keeping with block and Roman capitals. Undercoatings in oils; plain and ornamental surface treatments. The "lower" case letters drawn in conjunction with their respective capitals. Ground work and undercoatings required for the production of the popular woods in graining.

200—PAINTING AND DECORATING: THEORY 1

Purpose of painting. Cleanliness in working. Trade and health precautions. The paint shop: position, lighting, water. Heating various mixtures and storage. Brush washings, smudge holders, strainers. Zinc-covered benches; portable and fixed. Drawers for dry colours. Weighing up oil colours and dry colours. Oil drums, tanks, barrels, whitening and plaster bins. Paste flour and adhesives. Wall papers and wall coverings. Return of empties. Preservation of containers. Putting up materials for a job. Despatch of materials. Management of paint shop. Returned materials from job; waste. Fat colour for smudge; salvage of. Thinnings for smudge. Prevention of skinning. Hardening of stock colours; white lead. Colours in oil for storage and preservation. Stock articles and tools. Pickle tank and caustic removers. Lime. Ladders, care of. Handling and transport; lifting. Planks, boards, scantling, ropes. Poles, pulleys, cradles, fall ropes, and scaffold cords.

201—PAINTING AND DECORATING: PRACTICE AND THEORY 2

(a) Practice

Tints and shades from pigments in general use. Simple patterns. Counterchange and geometrical. Mixing of paints. Layouts in tints of same colour. Application of paints to various surfaces. Surface treatment, by pumice. Blow lamp and strippers. Setting out and painting block and Roman alphabets, with numerals.

Executed in positive and negative. Lining with pencil sable and fitches. Production of Key and Guilloche patterns with sable pencils and paints. Production of stencil designs from same motifs. Design and cutting of single plate stencils based on geometrical patterns. Trimming for paperhanging work. Short phrases for signboard and notices. Colour-matching with the "Three Primaries."

(b) *Theory*

Various hairs used in brushes; fixing hairs. Selection; test of good brushes. Distemper brushes; sizes; caustic lime brushes. How to bridle a brush. Pound and ground qualities. Varnish brushes; sash tools; stipplers. Fitches; softeners; stencil tools; sables. Storage of brushes; oil and water varieties. Principal stainers for stock; coach colours. Drying agents; liquids, paste and powder driers. Thinners and solvents; oils and spirits. Mediums and binders; patent distempers. Plaster and stoppings; glass paper and abrasives. Size distempers; advantages; objections. Surfaces for distempers. Colour limit for distempers; durability. Preparing for distemper. Washing off old distempers. Tinting distempers and stippling. Painting plaster prior to distempering. Damp walls and distemper. Distempers. Plain painting on new walls. First, second and flatting coatings. Painting on stucco and cement walls. Paperhanging requirements. Preparation of walls. Pastes. Trimming, pasting, matching. Lining papers; ceiling papers. Cracked ceilings and walls; panels. Borders; relief materials.

202—PAINTING AND DECORATING: PRACTICE AND THEORY 3

(a) *Practice*

Setting out and painting a Roman alphabet. Production of signs, posters and inscriptions in Roman and Block lettering. Interlacing ornament; the spiral and other forms of radiating ornament with pencil and paint. Painting and producing designs from similar motifs for mural execution. Design and use of multiple stencil plates. Positive and negative treatments of foregoing. Colour effects leading to imitative marble effects. The execution of the silver grain in oak. The production of sap markings and other timbers. Effects obtained by use of overgrainers, steel, combining, rollers, etc. Measurement,

trimming, cutting and hanging of patterned papers. Various after-treatments for wall hangings.

(b) *Theory*

The chromatic circle; its application in painting. Theory of colour and pigment mixtures. Classes of colour combinations. Colour values and qualities. Requirements for study of colour. How to decide a colour scheme. General rules for colour mixing. Colour combinations for the trade. Effects of artificial light on colour. Pigments safe and unsafe for mixing. Distemper mixing; permanent and fugitive. Oils and colour mixings for paints. Drying action of paints. Opaque and transparent pigments. Matching colours in oil paint. Rules for matching colours. Mixing tints and distemper colours. Quantity of paint to cover given area. List of oil colours in paste form. Filling and "stopping" mixtures. Mixing plaster and cement for repairs. Surfaces suitable for distemper. Distempers, advantages, and objections. Durability of distempers. Plain and patent. Cleaning down distemper; "turning up." Washing off old distempers. Methods. Painting plaster prior to distempering. Damp walls. Their prevention and treatments. Stippling distempers; tools required. Various proprietary brands of distemper.

203—PAINTING AND DECORATING: PRACTICE AND THEORY 4

(a) *Practice*

Intermixing of pigments; their influences on each other. Harmonising colours for matching schemes of lighting and surfaces. Colour and plastic combing. Combing plastic material and tinting. Exercises with use of spray gun in paint and other media. Study of signs, inscriptions. Notice boards for various uses. Stencilling direct to ceilings, walls and other surfaces. Stencilling with spray gun. Use of masks and templates. Measurement, trimming, cutting. Hanging patterned papers. Preparation for varnishing. Stencilling borders and application of same. Textured papers in stile and panel effects. Elementary chemical requirements of trade for oils and pigments. Preparation of simple schemes for "working drawings" for shop facias, lettering jobs, "decoration."

(b) Theory

Varnishes; qualities and types of varnishes. Cellulose varnishes and enamels; lacquers. Elastic and hard varnishes; their applications. Successive coatings of varnishes; advantages. Care in varnishing; accessories and their uses. Faults in varnishing; pinholing; cissing. Pitting, gritty, cracking, blooming varnishes. Oil and varnish based enamels. Oil and varnish stains; application on surfaces. Stains in oil, water, spirits, beer and wax. Graining of various woods. What to imitate in graining. Good and bad features. Limits to imitation in woods and marbles. Positions suitable for graining. Graining oak, light, medium and dark. Mahogany and walnut graining. Pitch pine and rosewood graining. Ash and fancy woods for various surfaces. Lettering with thickness and shading. Lettering and methods of working. Colouring of lettering. Layout and sign-painting. Enrichments and prominence of lettering. Tracings, pounces, and stencil letters. Signpainter's kit of tools. House painter's and coach painter's work. Preparations and undercoatings for coach work. Filling up and rubbing down. Striping and lining, lettering and ornament. Spraying, transfers, finishes and varnishing. *During the above Course of Lectures attention will be given to new Decorative Processes as they come on the market*

204—CABINETMAKING: PRACTICE AND THEORY 1

(a) Practice

Making of the fundamental joints and their application to good cabinet construction. Halved and bridge joints, mortise and tenon joints, dovetail joints, glued joints, etc. These joints applied in the making of small articles of good design and utility.

(b) Theory

Construction and uses of the principal tools; grinding and sharpening. The nature, properties and sources of the more common woods, including growth, felling, conversion, seasoning, etc. Joints used in cabinetwork. Glue and casein; preparation and use. Workshop appliances and trade terms. The fitting and fixing of hinges, locks, handles, etc. Preparation of working drawings, full size and to scale. Oblique and isometric projection. Simple problems in geometry as applied to cabinetwork.

205—CABINETMAKING: PRACTICE AND THEORY 2

(a) Practice

Making of larger pieces of work, involving the application of various cabinet joints. Veneering on flat and shaped work. Inlaying of strings, bandings and simple shapes. Working of simple mouldings, etc.

(b) Theory

Choice of suitable woods for various purposes, cutting lists and calculations. Uses and maintenance of tools. The setting out of more advanced cabinet joints. Drawer and door framing details. Simple table and carcass construction; built-up cornices, surbases and plinths. Building up of shaped work. Preparation of grounds and veneers for flat and shaped work; appliances and methods used. Cabinet metal fittings; different varieties and uses. Heights and sizes of furniture for particular uses. Preparation of working drawings. Illustration of terms. Enlarging diminishing of mouldings, etc.

206—CABINETMAKING: PRACTICE AND THEORY 3

(a) Practice

Further application of Second Year Syllabus in the making of more advanced examples of good cabinetwork.

(b) Theory

Construction and details of more advanced pieces of cabinetwork. List of materials. Setting out of barred doors; straight bar and geometrical pattern. Matching and building-up of veneer patterns, bandings and inlays. Methods of building up curved and shaped work generally. Veneering on flat and shaped work. Methods of making work stand after veneering. Average sizes for various furniture pieces. Illustration of terms. Cabinet metal fittings. Preparation of rods and scale drawings.

207—CABINETMAKING: PRACTICE AND THEORY 4

(a) Practice

In this class students are allowed freedom in their choice of articles, and are encouraged to make more difficult and larger

examples of good cabinetwork, with veneer as a means of decoration on both flat and shaped work.

(b) *Theory*

Mechanical actions for bureaus, writing tables, cylinder fall and roll top desks. Construction and details of tables of various kinds, extension, gate leg, pillar, elliptical, and folding-card tables. Inlaying and veneering with ivory, tortoiseshell, mother-of-pearl, metals and plastics. Laying and treatment of marquetry work. Methods of furniture decoration. Tendencies in contemporary furniture design and construction. Period styles. Illustration of terms applied to furniture. Preparation of rods and scale drawings.

208—COACH AND MOTOR BODY BUILDING:
PRACTICE 1

Timbers used; natural and artificial seasoning. Making joints. Mortise and tenon. Mortise and tenon with haunch. Double mortise and tenon. Window corner blocks. Doorway corner blocks. Making working drawing of a door. Setting out patterns and framework. Setting out doorway framing. Fitting door hinges. Reading drawings and print. The various forms of body construction. Making working drawing of back end. Proportional development for use in the shops. Making patterns. Setting out framework. Fitting framework.

209—COACH AND MOTOR BODY BUILDING:
THEORY AND DRAWING 1

Geometric designs. Mensuration of plane surfaces and solids. Scales, their construction and use. Designing and drawing joints. Isometric drawings. Timbers used, and purpose for which each kind is best suited. Calculations. Relative strength of materials. Designing and drawing sections of framing. The use of bent timber and method of preparation. The principal chassis dimensions required before designing a body. The principal body dimensions to govern in designing a body. Designing and drawing an open touring body. Designing and drawing a saloon body. Designing and drawing a creel lorry.

210—COACH AND MOTOR BODY BUILDING:
PRACTICE 2

Reading drawings and prints. Designing and drawing joints. iron and steel. Making working drawing of back end. Fitting doorway corner blocks. Calculations. The properties of development of corners. Cutting list, making patterns. Economical use of timber. Setting out framework. Cutting pillars, rails and corners. Fitting framework. Fitting corner blocks. Covering doors.

211—COACH AND MOTOR BODY BUILDING:
THEORY AND DRAWING 2

Reading drawings and prints. British and metric systems of measurements. Relative strength of materials. Calculations. Designing and drawing a swept door. Framing, with a list of materials required. Fittings and mountings in general use. Detail drawing of ironwork. Machinery and plant in general use. Proportional development of round type cowl, roof bow round corners, side roof rail corners, wheel house. Determining straight lines on hood or cowl. Designing and drawing an open touring body. Preparing working draft. Designing and drawing a commercial lorry. Detail drawings of ironwork. Preparing working draft. Designing and drawing simple jigs for assemblers.

212, 214—COACH AND MOTOR BODY BUILDING:
PRACTICE 3, 4

Reading drawings and prints. Calculations. British and metric systems of measurements. Making working drawing of motor body. Proportional development of corners. Detail drawings of joints. Quantities of materials required. Cutting out patterns. Marking out and economical use of timber. Cutting and fitting framework. The making of jigs for assemblers. Panel beaters. The various forms of body construction. Calculations.

213, 215—COACH AND MOTOR BODY BUILDING:
THEORY AND DRAWING 3, 4

Reading drawings and prints. British and metric systems of measurements. Mensuration. Fittings and mountings in general use.

The various forms of body construction. Designing and drawing a saloon body. Preparing working draft. Proportional development. Relative strength of materials. Designing and drawing jigs for assemblers and panel beaters. The various forms of body construction. Designing and drawing a (timber) single deck bus. Preparing working draft. Proportional development of corners. Designing and drawing a (steel) single deck bus. Detail drawings of ironwork.

216—COACHTRIMMING: PRACTICE AND THEORY 1

Handsewing: straight stitch, cross stitch, French stitch, with wax end, tufting, quilting, buttoning. Canvassing: stitching to frame, tacking to wooden frame. Webbing: on metal frame. on wooden frame. Frame making for cushions. Spring making for cushions. Fixing springs to canvas frame. Fixing springs to wooden frame. Fillet making. Fillets for doors. Fillets for windows. Fillets for centre pillars. Fillets for wheel arches. Covering fillets. Panel making. Header panels. Quarter panels. Toe panels. Rear compartment panels. Door panels.

217—COACHTRIMMING: PRACTICE AND THEORY 2

The various materials used in trimming. Draught excluder. Making up draught excluder. Fixing draught excluder to car. Unsprung plain soft cushions. Cutting out cover for soft cushion. Machine sewing cover for soft cushion. Stuffing and making up soft cushion. Quilting soft cushions. Tufting soft cushions. Buttoning soft cushions. Various adhesives and their uses. Carpets for floor and doors. Marking out carpets. Machining and binding. Fixing to floor and doors. Rubber mats. Cutting out and making up. Fixing rubber mats in car. Panel covering. Covering header, quarter, toe and rear compt. panels. Door panels; design. Padding door panels. Cutting out door panel covers. Machining door panel covers. Door pockets; design. Cutting out door pockets. Machining door pockets. Making up complete set of door panels.

218—COACHTRIMMING: PRACTICE AND THEORY 3

The sewing machine. Light sewing machines. Heavy sewing machines. Machine sewing: straight sewing. piping, finishing, binding. Foundations of box-spring cushions and squabs. Canvassing, padding and stuffing box-spring cushion. Canvassing, padding and stuffing box-spring squab. Cutting out plain cushions and squabs. Fitting covers and borders to plain cushions and squabs. Making up complete plain sprung cushion. Making up complete plain sprung squab. Machining and piping cover for plain cushion or squab. Marking out fluted cushions and squabs. Machining fluted cushion. Padding and stuffing fluted cushion. Making up complete fluted cushion. Marking out panelled cushions and squabs. Machining panelled cushion. Padding and stuffing panelled cushion. Making up complete panelled cushion. Marking out diamond patterned cushions and squabs. Padding and stuffing diamond patterned cushion. Making up and buttoning diamond patterned cushion. Marking out roll-front and pleated cushions and squabs. Machining out roll-front and pleated cushions and squabs. Making up roll-front and pleated cushions and squabs.

219—COACHTRIMMING: PRACTICE AND THEORY 4

Bucket seats. Bucket seat cushion. Cutting, machining, making. Bucket seat back. Cutting, machining, making. Fixed roof and sliding roof. Fixed roof frame. Covering fixed roof. Sliding roof frame. Covering sliding roof. Fixing sliding roof to car. Interior head lining. Taking measurements, marking and cutting out. Machining listings to head lining. Fitting and finishing head lining in car. Fitting and fixing panels and fillets in car. Fitting and fixing cushions and squabs in car. Loose covers; cutting, fitting and making. The complete layout of a modern saloon car. Pattern making; underlay. Pattern making; overlay. Cutting out single items. Cutting out quantities. Hand cutting. Machine cutting. Hood-making on coupé and sports cars. Measuring for hood. Marking out material for hood. Cutting out material for hood. Fitting and machining hood. Making up complete hood.

220—COACHPAINTING: THEORY AND PRACTICE 1

(a) Theory

Tools used in the trade; care of tools; theory of colours. The use of priming coat for metal and timber. Preparation of timber and metal for priming. How to make the priming coat for timber and metal. Method of application of priming to timber and metal. Making up of knife stopping. Method of applying stopping. How to make brush filling. Method of applying filling. Making up the guide coat for pumicing. Freehand drawing of letters used in the trade.

(b) Practice

Preparation of work; cleaning down with pumice. Brick and waterproof papers. Priming; stopping up; brush filling; stain or guide coat.

221—COACHPAINTING: THEORY AND PRACTICE 2

(a) Theory

How to make surfacing coat after pumicing. Application of surfacing coat. How to make the ground colour. How to make up the glazing coat. Method of applying hard drying varnish. Care in the flatting down of surface before application of finishing varnish. Advance drawing of letters of various types used in the trade.

(b) Practice

Preparation of work after pumicing down. Making and applying the ground coat. Papering down and preparing coat for application of glazing coat. Flatting down glazing coat for application of hard-drying varnish. Flatting down hard-drying varnish with water papers or cuttle fish bone before application of finishing varnish. Applying the finishing varnish. Lettering.

222—COACHPAINTING: THEORY AND PRACTICE 3

(b) Practice

Fine lining with whip and sword liners. Picking out. Advanced lettering and painting of designs for use on traders' vehicles.

(a) Theory

Use of mediums used in the trade. Use of driers. Making up colours from any pigments. Drawing of designs from blackboard.

223—COACHPAINTING: THEORY AND PRACTICE 4

(b) Practice

Monogram designing and painting. Painting of crests. Application of gold leaf to letters and designs. Use of transfers in the trade. Painting with bronze and gold powders. Painting and designing various designs used on public vehicles.

(a) Theory

Use of cellulose and synthetic enamels on private and public vehicles. Making up colours in bulk for large output shops. Mediums used in the grinding of colours. Use of hard-drying varnish in wood polishing. Method of applying varnish and polishing. Materials used in polishing. Costing and estimating paint work on private and public vehicles.

GENERAL CURRICULUM OF THE SCHOOLS UNDER THE CONTROL OF The City of Dublin Vocational Education Committee

TECHNICAL INSTITUTE, BOLTON STREET.

Mechanical Engineering.	Architecture.
Motor Car Engineering.	Civil Engineering.
Marine Engineering.	Quantity and Building Surveying.
Mechanical Engineering Trades.	Building Technology.
Motor Car Engineering Trades.	Surveying and Levelling.
Smithwork and Art Ironwork.	Building Trades.
Brassfinishing.	Furniture Trades.
Watchmaking.	Coachbuilding, Coachtrimming and Coach-painting.
Oxy-Acetylene and Electric Welding.	Printing and Book Production.
	Day Junior Technical Courses.
	Day Apprentice Courses.

TECHNICAL INSTITUTE, CAPEL STREET

Continuation Courses. Post Office Messengers.
Manual Instruction: Woodwork, Metalwork. Day Junior Technical Courses.
Trade Classes:—Tailoring. Bootmaking. Hairdressing.

CABRA TECHNICAL INSTITUTE.

Day Junior Technical School.
Day School of Commerce.
General Commercial Subjects. Metalwork. Domestic Science and Housecraft.
Languages. Woodwork. Physical Training.
Science and Mathematics. Gardening.

INSTITUTE OF SCIENCE AND TECHNOLOGY—KEVIN ST.

Pure and Applied Mathematics.	Ophthalmic Optics.
Pure and Applied Physics.	Electrical Engineering and Allied Trades.
Pure and Applied Chemistry.	P.O. Engineering Technology.
Physical Chemistry.	Instrument Making.
Bio-Chemistry: Botany.	Radio Engineering and Service Work.
Bacteriology: Biology.	Radio Telegraphy (Radio Officers).
Pharmacy.	Air Navigation.
Industrial Technology: Manufactures.	Radar and Radar System.
Illuminating Engineering.	Bakery Science and Practice.
Bootmaking	

PARNELL SQUARE TECHNICAL INSTITUTE.

Day School of Commerce and Retail Distribution (Girls).
Day Junior School of Domestic Economy.
General Commercial Subjects. National Health Insurance.
Domestic Science and Housecraft. Preliminary Examinations.
Languages. Physical Training (Girls).
Retail Distribution.

HARCOURT STREET SCHOOL OF DOMESTIC SCIENCE.

Day Junior Domestic Economy.
Day and Evening Part-Time Classes in Cookery, Needlework, Dressmaking, etc.

PEMBROKE TECHNICAL INSTITUTES.

BALLSBRIDGE.	RINGSEND.
General Commercial Subjects.	Mechanical Engineering.
Languages.	Motor Car Engineering.
Domestic Science and Housecraft.	Oxy-Acetylene and Electric Welding.
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PRINTED BY
W. WARREN
AND SON, LTD.
DUBLIN
