1938

**Mechanical Engineering: Prospectus of Courses Session 1938-39**

City of Dublin Vocational Education Committee

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City of Dublin
Vocational Education Committee

scoileanna ceárd-oirdeácaíos
City of Dublin Technical Schools

Session
1938-39

MECHANICAL ENGINEERING
PROSPECTUS OF COURSES
BOLTON STREET
CALENDAR—SESSION 1938-39

1938 - SEPT 5, MONDAY Whole-time Day Schools open for enrolment. Day Apprentice School resumes work.
SEPT. 12, MONDAY Whole-time Day Schools commence work and Part-time Day Classes open for enrolment.
SEPT. 19, MONDAY Evening Classes open for enrolment and Part-time Day Classes resume work.
SEPT. 26, MONDAY Evening Classes commence work.
NOV. 1, TUESDAY All Saints’ Day. Whole-time Day Schools—excepting Day Apprentice School and Special Classes—closed.
DEC. 8, THURSDAY Feast of Immaculate Conception. Whole-time Day Schools—excepting Day Apprentice School and Special Classes—closed.
DEC. 14, WEDNESDAY Teaching work in Whole-time Day School ceases (excepting Day Apprentice School and Special Classes).
DEC. 15, THURSDAY Term Examinations in Whole-time Day School commence.
DEC. 21, WEDNESDAY Last meeting of Classes before Christmas Vacation.

1939 - JAN. 9, MONDAY All Classes resume work after Christmas Vacation.
MAR. 3, FRIDAY Land Surveying and Levelling Course begins.
MAR 17, FRIDAY St. Patrick’s Day. Schools closed.
MAR. 18, SATURDAY Land Surveying Field work begins. Motor Car Driving Lessons begin.
APR. 4, TUESDAY Last meeting of classes before Easter vacation.
APR. 12, WEDNESDAY All classes resume work after Easter vacation.
APR. 28, FRIDAY Evening Classes close—excepting Special Classes.
MAY 1, MONDAY Evening Examinations, if any, commence.
MAY 18, THURSDAY Ascension Day. Whole-time Day Schools—excepting Day Apprentice School and Special Classes—closed.
MAY 28, MONDAY Whit-Monday. Schools closed.
JUNE 8, THURSDAY Feast of Corpus Christi. Whole-time Day Schools—excepting Day Apprentice School and Special Classes—closed.
JUNE 24, SATURDAY Teaching work ceases in Whole-time Day Schools—excepting Day Apprentice School and Special Classes.
JUNE 26, MONDAY Sessional Examinations commence in Whole-time Day Schools—excepting Day Apprentice School and Special Classes.
JUNE 29, THURSDAY Feast of Saints Peter and Paul. Whole-time Day Schools—excepting Day Apprentice School and Special Classes—closed.
JULY 1, SATURDAY Whole-time Day Schools and Part-time Domestic Economy Classes close—excepting Day Apprentice School and Special Classes.
JULY 15, SATURDAY Day Apprentice School and Special Classes close.

Schools closed on all Bank Holidays not specified in above Calendar.

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<td>Day Apprentice and Daytime Technical Courses</td>
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</table>
GENERAL NOTICES

ENTRANCE EXAMINATIONS, FEES, REGULATIONS.

Applicants for admission to Courses or Classes must be at least fourteen years of age.

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

Fees: per Session.

Courses in Mechanical Engineering and
Motor Car Engineering .......... 7/6 for Course.

Introductory Course .......... 2/6 for Course.

Additional Course subjects .......... 2/6 each.

Single subjects .......... 7/6 each.

Students who through obtaining employment are unable to continue in attendance at the Whole-time Day School Courses of the Schools will be admitted to approved Evening Courses, without fees, up to the value of the Day School Fees paid.

The same concession may be extended to other students who have left the Day School Courses, if the reasons for their non-attendance are considered by the Principal to be adequate.

The Trade Classes are primarily intended for those engaged in the several trades. Others will not be admitted before November 7th, and then only if there be room, and on payment of a quadruple fee.
A Workshop Class can only be taken in conjunction with an approved Lecture or Drawing Class. No student will be allowed to continue in a Workshop Class if his attendance at the Lecture or Drawing Class is unsatisfactory.

A Class may be discontinued if an insufficient number of students join or attend; the number of evenings allotted weekly to a Class may be reduced if there be a falling off in the attendance. The right is reserved to close Classes for any other reason whatever.

Students must make good any damage done by them.

Strict order must be observed at all times within the precincts of the Schools.

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

SCHOOL CHOIRS AND DRAMATIC CLASSES.

The Committee is prepared to facilitate the organisation of Choral and Dramatic Societies and similar activities. Students interested are invited to communicate with the Principal of the Institute in which they are enrolled.

PROGRAMME and TIME TABLE

OF THE

Schools of Mechanical Engineering, Motor Car Engineering and Allied Trades

AT

Technical Institute—Bolton Street
MECHANICAL ENGINEERING
DEPARTMENT

TECHNICAL SCHOOL, BOLTON STREET

TEACHING STAFF.

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

A. M. MACLOUGHLIN, B.A., B. E. Fee.
A.R.C.SCI.

J. C. Slater.

W. D. PILE, A.M.I.M.E., M.I.A.E.
H. Holohan, B.A.

H. C. CLIFTON, B.A.

W. D. HORGAN, B.A.

R. B. CLARK.

M. NIALL, M.SC.

J. Lenihan.

H. C. FITZGERALD.

J. Kelly.

F. O'KELLY.

R. BENT.

E. J. KENNEDY.

P. CORMAC, D.SC., M.R.I.A.

P. MACGRAN.

R. J. DOWLING, A.M.I.M.E., R. BRYAN.

A. M. MacLaughlin.

A. J. WARD.

W. DIXON, B.SC., A.M.I.E.E.

W. MURTAGH.

W. A. COONEY.

J. DOOLEY.

G. MACKENZIE.

T. J. RYAN.

M. J. DOYLE.

F. RYAN.

COURSES AND TIME TABLES
BOLTON STREET

No. of Course | Subject                     | Day | Hour            | Room | Teacher             | No. of Sections
---|-----------------------------|-----|-----------------|------|---------------------|-----------------|
1B | Arithmetic                 | Mon. | 7.30-8.30      | B 20 | W. J. O'Brien       | 2
    | English                    | Mon. | 8.30-9.30      | B 20 | W. J. O'Brien       | 1
    | Practical Drawing          | Tues., Fri. | 7.30-9.30   | B 20 | B. E. Fee          | 3
    | Practical Drawing (Metal Plate Work) | Tues. | 7.30-9.30   | D 2  | J. Dooley          | 35

MECHANICAL ENGINEERING COURSE.

FIRST YEAR.

1B | Machine Drawing—L.A. or L.B. | Mon. | 7.30-9.30      | A 5  | H. C. FitzGerald    | 4
    | Engineering Workshop—II.   | Wed. | 7.30-9.30      | A 5  | B. E. Fee          | 4
    | Geometry                   | Thurs. | 7.30-9.30     | B 27 | R. J. Dowling      | 9
    | Mathematics—I.             | Fri.  | 7.30-9.30      | B 18 | J. J. Hughes       | 11

SECOND YEAR.

2B | Machine Drawing—II.        | Thurs. | 7.30-9.30     | A 5  | B. E. Fee          | 5
    | Engineering Science—I.A.   | Mon.  | 7.30-9.30      | C 8  | R. J. Dowling      | 16A
    | Mathematics II.            | Wed.  | 7.30-9.30      | C 22 | H. Holohan         | 12

THIRD YEAR.

3B | Engineering Workshop—III.  | Fri.  | 7.30-9.30      | A 5  | W. J. O'Brien       | 6
    | Applied Mechanics—II.      | Mon.  | 7.30-9.30      | C 7  | A. M. MacLaughlin  | 17
    | Mathematics—III.           | Wed.  | 7.30-9.30      | C 7  | H. C. Clifton       | 13

FOURTH YEAR.

4B | Machine Construction—IV.   | Thurs. | 7.30-9.30     | A 5  | W. J. O'Brien       | 7
    | Applied Mechanics—III.     | Wed.  | 7.30-9.30      | C 8  | A. M. MacLaughlin  | 18
    | Heat Engines—II.           | Fri.  | 7.30-9.30      | A 8  | R. J. Dowling      | 20
    | Mathematics—IV.            | Mon.  | 7.30-9.30      | C 7  | H. C. Clifton       | 14

FIFTH YEAR.

5B | Machine Design—V.          | Wed.  | 7.30-10.00     | B 27 | B. J. Dixon        | 8
    | Applied Mechanics—IV.      | Wed.  | 7.30-9.30      | C 8  | A. M. MacLaughlin  | 19
    | Heat Engines—III.          | Thurs.| 7.30-9.30      | A 8  | P. Cormac          | 21
    | Mathematics—V.             | Mon.  | 7.30-9.30      | C 7  | H. C. Clifton       | 15

MECHANICAL ENGINEERING TRADES COURSES.—ENGINEERING WORKSHOP PRACTICE.

FIRST YEAR.

1B | Engineering Workshop—I.    | Tue., Th. | 7.30-9.30  | D 7  | J. Kelly, J. J. Redmond | 22
    | Machine Drawing—L.A. or L.B. | Mon.  | 7.30-9.30      | A 5  | H. C. FitzGerald    | 4
    | Machine Drawing—L.B.       | Wed.  | 7.30-9.30      | A 5  | B. E. Fee          | 4
    | Engineering Science—I.B.   | Fri.  | 7.30-9.30      | C 8  | W. J. O'Brien       | 16B

SECOND YEAR.

2B | Engineering Workshop—II.   | Mon.  | 7.30-9.30      | D 7  | J. Kelly, J. J. Redmond | 23
    | Machine Drawing—II.        | Thurs.| 7.30-9.30      | A 5  | R. E. Fee          | 5
    | Mathematics—I.             | Fri.  | 7.30-9.30      | B 18 | J. J. Hughes       | 11

THIRD YEAR.

3B | Engineering Workshop—III.  | Fri.  | 7.30-9.30      | D 7  | J. Kelly, R. BENT  | 24
    | Applied Mechanics—II.      | Thurs.| 7.30-9.30      | C 8  | A. MacLaughlin     | 17
    | Mathematics—II.            | Wed.  | 7.30-9.30      | C 22 | H. Holohan         | 15
<table>
<thead>
<tr>
<th>No. of Course</th>
<th>SUBJECT</th>
<th>DAY</th>
<th>Hour</th>
<th>Room</th>
<th>TEACHER</th>
<th>No. of Syllabus</th>
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<tbody>
<tr>
<td>13B</td>
<td>Engineering Workshop—IV ...</td>
<td>Fri.</td>
<td>7.30-9.30</td>
<td>D 7</td>
<td>J. Kelly, R. Bent</td>
<td>29</td>
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<tr>
<td></td>
<td>Machine Construction—IV ...</td>
<td>Tues.</td>
<td>7.30-9.30</td>
<td>A 5</td>
<td>W. J. O'Brien</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Mathematics—III ...</td>
<td>Wed.</td>
<td>7.30-9.30</td>
<td>C 7</td>
<td>H. C. Clifton</td>
<td>13</td>
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**PATTERNMAKING.**

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<tr>
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<th>No. of Syllabus</th>
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<td>14B</td>
<td>Patternmaking—I ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>D 4</td>
<td>E. J. Kennedy</td>
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<td>Workshop Drawing and Calculations ...</td>
<td>Tues.</td>
<td>7.30-9.30</td>
<td>D 4</td>
<td>E. J. Kennedy</td>
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**SECOND YEAR.**

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<td>Fri.</td>
<td>7.30-9.30</td>
<td>D 4</td>
<td>E. J. Kennedy</td>
<td>27</td>
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<td>Machine Drawing—I ...</td>
<td>Wed.</td>
<td>7.30-9.30</td>
<td>A 5</td>
<td>B. E. Fee</td>
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**THIRD YEAR.**

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<th>No. of Syllabus</th>
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<td>16B</td>
<td>Patternmaking—III ...</td>
<td>Fri.</td>
<td>7.30-9.30</td>
<td>D 4</td>
<td>E. J. Kennedy</td>
<td>28</td>
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<tr>
<td></td>
<td>Machine Drawing—II ...</td>
<td>Thurs.</td>
<td>7.30-9.30</td>
<td>A 5</td>
<td>B. E. Fee</td>
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Students are recommended to add a suitable class in Mathematics.

**FOUNDRY WORK**

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<th>No. of Syllabus</th>
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<td>17B</td>
<td>Ironmoulding ...</td>
<td>Wed.</td>
<td>7.30-9.30</td>
<td>D 4</td>
<td>P. McGran</td>
<td>29</td>
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<tr>
<td></td>
<td>Workshop Drawing and Calculations ...</td>
<td>Tues.</td>
<td>7.30-9.30</td>
<td>D 4</td>
<td>E. J. Kennedy</td>
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**BRASSFINISHING.**

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<th>No. of Course</th>
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<tr>
<td>22B</td>
<td>Brassfinishing, Practical I ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>D 5</td>
<td>W. Murtagh</td>
<td>31</td>
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<tr>
<td></td>
<td>Engineering Science—I ...</td>
<td>Fri.</td>
<td>7.30-9.30</td>
<td>C 8</td>
<td>W. J. O'Brien</td>
<td>16</td>
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<td>Machine Drawing—I ...</td>
<td>Wed.</td>
<td>7.30-9.30</td>
<td>A 5</td>
<td>B. E. Fee</td>
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**BOILERMAKING.**

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<td>Boilermaking, Lectures and Drawing—I ...</td>
<td>Tues.</td>
<td>7.30-9.30</td>
<td>B 4</td>
<td>R. Bryan</td>
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<td>Boilermaking, Practical I ...</td>
<td>Wed.</td>
<td>7.30-9.30</td>
<td>D 9</td>
<td>R. Bryan</td>
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**Boilermaking, Lectures and Drawing II ...**

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<th>No. of Course</th>
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<td>27B</td>
<td>Thurs.</td>
<td>7.0-9.30</td>
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<td>R. Bryan</td>
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<tr>
<td></td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>D 9</td>
<td>R. Bryan</td>
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Students are recommended to add a suitable class in Mathematics.

**SMITHWORK.**

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<th>No. of Syllabus</th>
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<td>30B</td>
<td>Smithwork, Practical ...</td>
<td>Tues.</td>
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<tr>
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<td>Machine Drawing—IA ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>A 5</td>
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<td>B. E. Fee</td>
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**ART IRONWORK.**

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<td>31B</td>
<td>Art Ironwork, Practical—I ...</td>
<td>Fri.</td>
<td>7.30-9.30</td>
<td>D 9</td>
<td>A. J. Ward</td>
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Students are recommended to add a class in Design.

**METAL PLATE WORK.**

<table>
<thead>
<tr>
<th>No. of Course</th>
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<th>Room</th>
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<tr>
<td>32B</td>
<td>Metal Plate Work, Lecture and Drawing—I ...</td>
<td>Tues.</td>
<td>7.30-9.30</td>
<td>C 5</td>
<td>J. Dooley</td>
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<td></td>
<td>Metal Plate Work, Practical—I ...</td>
<td>Thurs.</td>
<td>7.30-10.0</td>
<td>D 2</td>
<td>J. Dooley, T. J. Ryan</td>
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**SECOND YEAR.**

<table>
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<th>Room</th>
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<tbody>
<tr>
<td>33B</td>
<td>Metal Plate Work, Lecture and Drawing—II ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>C 5</td>
<td>J. Dooley</td>
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<td></td>
<td>Metal Plate Work, Practical—II ...</td>
<td>Wed.</td>
<td>7.30-10.0</td>
<td>D 2</td>
<td>J. Dooley, T. J. Ryan</td>
<td>42</td>
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**THIRD YEAR.**

<table>
<thead>
<tr>
<th>No. of Course</th>
<th>SUBJECT</th>
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<th>Hour</th>
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<tbody>
<tr>
<td>34B</td>
<td>Metal Plate Work, Lecture and Drawing—III ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>O 5</td>
<td>J. Dooley</td>
<td>41</td>
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<tr>
<td></td>
<td>Metal Plate Work, Practical—III ...</td>
<td>Wed.</td>
<td>7.30-10.0</td>
<td>D 2</td>
<td>J. Dooley, T. J. Ryan</td>
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</tr>
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</table>

Students are recommended to add a class in Design.

**OXY-Acrylene Welding.**

<table>
<thead>
<tr>
<th>No. of Course</th>
<th>SUBJECT</th>
<th>DAY</th>
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<th>TEACHER</th>
<th>No. of Syllabus</th>
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</thead>
<tbody>
<tr>
<td>41B</td>
<td>Oxy-Acetylene Welding, Practical ...</td>
<td>Tues., Fri.</td>
<td>7.30-9.30</td>
<td>D 2</td>
<td>T. J. Ryan</td>
<td>43</td>
</tr>
</tbody>
</table>

**GAS FITTING.**

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

<table>
<thead>
<tr>
<th>No. of Course</th>
<th>SUBJECT</th>
<th>DAY</th>
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<th>TEACHER</th>
<th>No. of Syllabus</th>
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</thead>
<tbody>
<tr>
<td>42B</td>
<td>Lectures and Calculations—I ...</td>
<td>Thurs.</td>
<td>7.30-9.30</td>
<td>B20</td>
<td>R. B. Clark</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Gas Fitting, Practical—I ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>B21</td>
<td>J. Lenihan</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Gas Fitting, Practical—IB ...</td>
<td>Wed.</td>
<td>7.30-9.30</td>
<td>B21</td>
<td>J. Lenihan</td>
<td>47</td>
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</table>

**SECOND YEAR.**

<table>
<thead>
<tr>
<th>No. of Course</th>
<th>SUBJECT</th>
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<th>Room</th>
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<th>No. of Syllabus</th>
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<tbody>
<tr>
<td>43B</td>
<td>Lectures and Calculations—I ...</td>
<td>Wed.</td>
<td>7.30-8.30</td>
<td>B20</td>
<td>R. B. Clark</td>
<td>45</td>
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<td></td>
<td>Gas Fitting, Practical—I ...</td>
<td>Fri.</td>
<td>7.30-9.30</td>
<td>B21</td>
<td>J. Lenihan</td>
<td>48</td>
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</table>

**THIRD YEAR.**

<table>
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<tr>
<th>No. of Course</th>
<th>SUBJECT</th>
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<th>TEACHER</th>
<th>No. of Syllabus</th>
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</thead>
<tbody>
<tr>
<td>44B</td>
<td>Lectures and Calculations—III ...</td>
<td>Wed.</td>
<td>8.35-9.25</td>
<td>B20</td>
<td>R. B. Clark</td>
<td>46</td>
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<tr>
<td></td>
<td>Gas Fitting, Practical—III ...</td>
<td>Thurs.</td>
<td>8.0-10.0</td>
<td>B21</td>
<td>J. Lenihan</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Machine Drawing—I ...</td>
<td>Mon.</td>
<td>7.30-9.30</td>
<td>A 5</td>
<td>J. C. Slater</td>
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</table>

Students are recommended to add a suitable class in Mathematics.
### Introductory

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
<th>Teacher</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Car Lecture</td>
<td>Mon.</td>
<td>7:30-9:30</td>
<td>B 15</td>
<td>W. A. Cooney</td>
<td>59</td>
</tr>
<tr>
<td>Practical Drawing</td>
<td>Tues.</td>
<td>7:30-9:30</td>
<td>B 20</td>
<td>H. E. Fox</td>
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</table>

Additional Subjects, Trade Students only—

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
<th>Teacher</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Car Workshop</td>
<td>Wed.</td>
<td>7:30-9:30</td>
<td>D 8</td>
<td>G. Mackenzie</td>
<td>55</td>
</tr>
<tr>
<td>Engineering Workshop I.</td>
<td>Tues.</td>
<td>7:30-9:30</td>
<td>D 7</td>
<td>J. Kelly, J. J. Bednord</td>
<td>22</td>
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</table>

### Motor Car Engineering Course

#### First Year

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day</th>
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<th>Room</th>
<th>Teacher</th>
<th>Syllabus</th>
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</thead>
<tbody>
<tr>
<td>Motor Car Engineering—I.</td>
<td>Wed.</td>
<td>8:30-9:30</td>
<td>B 15</td>
<td>W. A. Cooney</td>
<td>51</td>
</tr>
<tr>
<td>Science &amp; Mathematics—L</td>
<td>Tues.</td>
<td>7:30-9:30</td>
<td>A 8</td>
<td>J. J. Hughes M. Niall</td>
<td>58</td>
</tr>
<tr>
<td>Electricity—L. or</td>
<td>Wed.</td>
<td>7:30-9:30</td>
<td>A 8</td>
<td>W. D. Horgan</td>
<td>60</td>
</tr>
<tr>
<td>Motor Car Workshop—L.</td>
<td>Thurs.</td>
<td>7:30-9:30</td>
<td>D 8</td>
<td>G. Mackenzie</td>
<td>55</td>
</tr>
<tr>
<td>Engineering Workshop—L.</td>
<td>Mon.</td>
<td>7:30-9:30</td>
<td>D 7</td>
<td>J. Kelly, J. J. Bednord</td>
<td>22</td>
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#### Second Year

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<thead>
<tr>
<th>Subject</th>
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<th>Syllabus</th>
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<tbody>
<tr>
<td>Motor Car Engineering—II.</td>
<td>Thurs.</td>
<td>7:30-9:30</td>
<td>B 15</td>
<td>W. D. File</td>
<td>62</td>
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<tr>
<td>Motor Car Electricity—II.</td>
<td>Tues.</td>
<td>7:30-9:30</td>
<td>B 18</td>
<td>J. J. Hughes</td>
<td>69</td>
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<tr>
<td>Motor Car Mechanics—II.</td>
<td>Wed.</td>
<td>7:30-9:30</td>
<td>B 2</td>
<td>W. D. Horgan</td>
<td>59</td>
</tr>
<tr>
<td>Science—II.</td>
<td>Wed.</td>
<td>8:35-9:35</td>
<td>A 8</td>
<td>G. Mackenzie</td>
<td>56</td>
</tr>
<tr>
<td>Motor Car Workshop—II.</td>
<td>Fri.</td>
<td>7:30-9:30</td>
<td>D 8</td>
<td>G. Mackenzie</td>
<td>56</td>
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#### Third Year

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day</th>
<th>Time</th>
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<th>Teacher</th>
<th>Syllabus</th>
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<tbody>
<tr>
<td>Motor Car Engineering—III.</td>
<td>Nov.</td>
<td>7:30-9:30</td>
<td>A 8</td>
<td>W. D. File</td>
<td>53</td>
</tr>
<tr>
<td>Motor Car Electricity—III.</td>
<td>Wed.</td>
<td>7:30-9:30</td>
<td>B 18</td>
<td>J. J. Hughes</td>
<td>63</td>
</tr>
<tr>
<td>Applied Mechanics—II. or</td>
<td>Thurs.</td>
<td>7:30-9:30</td>
<td>C 8</td>
<td>A. MacLoughlin</td>
<td>17</td>
</tr>
<tr>
<td>Motor Car Workshop—III.</td>
<td>Fri.</td>
<td>7:30-9:30</td>
<td>D 8</td>
<td>G. Mackenzie</td>
<td>57</td>
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### Course for Motor Car Drivers

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
<th>Teacher</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Car Engineering</td>
<td>Fri.</td>
<td>7:30-9:30</td>
<td>B 15</td>
<td>W. A. Cooney</td>
<td>54</td>
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</tbody>
</table>

#### Motor Car Driving

For particulars of this Afternoon course see page 28

### Watch and Clock Making

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
<th>Teacher</th>
<th>Syllabus</th>
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</thead>
<tbody>
<tr>
<td>Theory &amp; Drawing</td>
<td>Thurs.</td>
<td>7:30-9:30</td>
<td>C 4</td>
<td>P. O'Kelly</td>
<td>64</td>
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<tr>
<td>Practical Work</td>
<td>Thurs.</td>
<td>8:35-10:35</td>
<td>C 4</td>
<td>P. O'Kelly</td>
<td>64</td>
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### Irish

<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
<tr>
<td>Irish</td>
<td>Mon.</td>
<td>7:30-9:30</td>
<td>C 2</td>
<td>F. Ryan</td>
<td>65</td>
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</tbody>
</table>

### Land Surveying and Levelling

Commencing early in March, 1989, a short intensive course will be held in Land Surveying and Levelling, comprising lectures and practical demonstrations in field work. (Syllabus No. 60)

For particulars see Prospectus C.

### Syllabuses

#### Subjects

1—**English.**

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

2—**Workshop Arithmetic.**

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

3—**Practical Drawing.**

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

4—**Machine Drawing, I.**

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

5—**Machine Drawing, II.**

6—Machine Construction, III.


7—Machine Construction and Design, IV.

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

8—Machine Design, V.

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

9—Practical Geometry.


10—Practical Mathematics, I.

Arithmetic: Simple and compound rules, calculations of prices and costs, fractions, decimals, contracted methods, percentages, ratio and proportion, square root. Mensuration: Square, rectangle, triangle and circle, areas, volumes; applications of geometry to problems. Algebra: Symbols, the four simple rules, simple equations, evaluation and transformation of formulae, factors. Elementary graphs.

12—Practical Mathematics, II.


13—Practical Mathematics, III.

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

14—Practical Mathematics, IV.

Binominal expansions and approximations. Exponential and logarithmic theorems. Calculations of logarithms to the exponential base and their transformation to a decimal or other base. Tabular study of the rate of increase and graphical study of the slope of curve of simple functions of a varying quantity, i.e., powers, trigonometrical,
logarithmic and exponential functions. Differentials of such simple functions; of their sum, difference of product, and the function of a function. Successive differentiation and determination of the maximum and minimum values of a function. Integration as a process of summation, and as the inverse of differentiation. Simple harmonic motion.

15—Practical Mathematics, V.


16A—Engineering Science, Ia.


Speed, linear and angular. Velocity ratio of wheel trains, belt and pulley gearing and simple lifting machines. Work, work diagrams, horse-power. Resultant force, equilibrium of three forces, triangle of forces.


16B—Engineering Science, Ib.

British and metric units of measurement. Fractions, decimals. Simple mensuration applied to workshop problems. Measuring instruments, the foot rule, micrometer, vernier. Fits, limits, limit and other gauges. Engineering materials, their production, properties and applications.

Machine tools, power transmission, toothed gearing and wheel trains, belt and pulley gearing, screws. Force, work, power.

17—Applied Mechanics, II.


18—Applied Mechanics, III.


19—Applied Mechanics, IV.


20—Heat Engines, II.

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


22—Engineering Workshop, I.


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

23—Engineering Workshop, II.


24—Engineering Workshop, III.


25—Engineering Workshop, IV.

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

26—Patternmaking, I.

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

27—Patternmaking, II.

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

28—Patternmaking, III.

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

29—Iron Moulding.

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

Orthographic projection. Simple exercises in drawing as applied to patternmaking and foundry work. Interpretation of prints and drawings of castings. Elementary calculations required for foundry work.

31—**Brass Finishing, I.**

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

32—**Brass Finishing, II.**

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

33—**Boiler Making, Lectures and Drawing, I.**


34—**Boiler Making, Lectures and Drawing, II.**

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

35—**Boiler Making, Practical, I.**


36—**Boiler Making, Practical, II.**

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

37—**Smithwork.**


38—**Art Ironwork.**

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

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

Lectures: Fuels used in metal plate work. Metals: characteristics and applications of tinplate, zinc, copper and iron. Solders and brazing materials. Galvanising, tinning and re-tinning processes. Calculations of dimensions, capacities and weights of vessels of various designs.

Drawing: Geometrical problems involved in metal plate work; intersections and penetrations. Development of patterns for vessels and other objects of simple form such as:—Cylindrical pipes and branches, coned articles in two or more pieces, equal tapering bodies, baking pans; objects with combined flat and coned surfaces, tee pipes, bends in two or more pieces, V and Y pipes. Patterns for finials, simple mouldings, gutters and other roofwork details. Principal joints used in metal plate work practice.

40—**Metal Plate Work, Practical, I.**

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

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

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

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

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

43—Oxy-Acetylene Welding.

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

44—Gas Fitting, Lectures and Calculations, I.


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

45—Gas Fitting, Lectures, II.

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

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

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

46—Gas Fitting, Lectures, III.

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

47—Gas Fitting, Practical, I.

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

48—Gas Fitting, Practical, II.

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

Examination and practical study of L.P. lighting burners and lamps; ventilation arrangements; gas and air controls. Burners and castings of small cooking stoves; oven ventilation; spacing of hot
49—GAS FITTING, PRACTICAL, III.

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

50—MOTOR CAR LECTURE—INTRODUCTORY.

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

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

51—MOTOR CAR ENGINEERING, I.

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

52—MOTOR CAR ENGINEERING, II.

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

53—MOTOR CAR ENGINEERING, III.

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

54—MOTOR CAR ENGINEERING (DRIVERS).

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

55—MOTOR CAR WORKSHOP, I.

Simple fitting work involving the use of tools for measuring and marking out, cutting, filing, testing, bending, drilling, reaming, riveting, soldering, brazing, screwing and tapping. The care and repair of hand tools including annealing, dressing, hardening, tempering and grinding. Making simple hand tools. Elementary tube and pipe work in copper, and working sheet metal by hand methods.
56—Motor Car Workshop, II.
Advanced work on Syllabus of First Year. Use of micrometer and other high-grade measuring instruments in garage work. Preparation of tools and appliances for garage use. Simple exercises on motor car engine units.

57—Motor Car Workshop, III.

58—Science and Mathematics, I.

The lessons will comprise both lectures and practical work in the laboratory.

The numerical problems arising in connection with the classes in Physics will be used as a basis for training in Mathematical Work. (See Syllabus No. 11.)

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

Chemistry: Molecules and atoms, elements and compounds, chemical symbols, the atomic theory, atomic weights, quantitative notation, valency. Water, carbon, carbon dioxide; carbon monoxide; carbides; combustion; ignition point; flame; the Bunsen burner. Hydrochloric acid, zinc chloride. Lead, its oxide and sulphate, brief treatment of iron, aluminium, tin and zinc. The paraffin group.

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

61—Motor Car Electricity, I.

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

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

64—Watch and Clock Making.


65—Irish.

Conversation lessons on simple matters such as the name, home or residence, salutations, the clock, days of the week, months and seasons, the weather, money, easy counting, colours, etc. Location of objects in the classroom and neighbourhood, parts of the body and clothing, giving and carrying out simple orders. The use of is and tó, and of verbal nouns.

Memorising of simple songs, rhymes and stories, in order to acquire the correct blas.

66—Land Surveying and Levelling.

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

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

Surveying with the Chain; equipment; ranging and measuring a line; simple surveys, arrangement of survey lines, triangulation; booking the survey; methods of dealing with surveys of average extent; various field operations and problems; traversing with the chain; setting out curves.

Ordinance survey plans, scales, conventional symbols.

Levelling; the dumpy and tilting levels; simple and compound levelling; booking and reduction of levels; checks; datum, bench mark; sections; contours; permanent adjustments of the level.

Magnetic compass, declination, bearings.

Surveying with the Theodolite; the vernier; measurement of horizontal angles; traversing; methods of plotting; co-ordinates; adjustment of closing error; adjustments of the instrument.

Calculation of Areas; method of triangles; planimeter; computing scale.

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

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

Special Afternoon Course.

Commencing in March, 1939, a limited series of lessons will be arranged on Saturday from 2.30 to 6 p.m., or on other suitable afternoons, in Motor Car Driving. The instruction will comprise:

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

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

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

Fee for Course, £2.

DAY APPRENTICE SCHOOL

WATCHMAKING.

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

Subjects and number of hours per week:

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Total 30 hours
DAY ENGINEERING COURSES.

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

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

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

Subjects and approximate number of hours per week:—Workshops, Trade Lectures, Mechanics, Machine Drawing, Electricity, 21 hours. Geometry, Science, Mathematics, Irish, English, 9 hours. Total 30 hours.
GENERAL CURRICULUM OF THE SCHOOLS
UNDER THE CONTROL OF
THE CITY OF DUBLIN VOCATIONAL EDUCATION COMMITTEE.

BOLTON STREET TECHNICAL SCHOOL

Motor Car Engineering. Building and Allied Trades.
Gas Engineering. Printing and Book Production.
Metal Plate Work. Watchmaking.
Brass Finishing. Art and Art Crafts.
Day Apprentice and specialised Daytime Technical Courses.
Day Junior Technical School.

KEVIN STREET TECHNICAL INSTITUTE

Pure and Applied Chemistry. Domestic Science and Housecraft.
Bacteriology. Bakery Science and Practice.
Pharmacy. Bootmaking.
Electrical Engineering and Allied Trades. Hairdressing.

PARNELL SQUARE TECHNICAL INSTITUTE

General Commercial Subjects. Transport.
Accountancy and Allied Subjects. Day Trade Classes:—
Local Government. Dressmaking.
Domestic Science and Housecraft. Shirtmaking (Power).
Languages. Clothing Manufacture (Power)
Physical Training.

Day School of Commerce.
Day Trades Preparatory Course (Girls).
GENERAL CURRICULUM OF THE SCHOOLS
UNDER THE CONTROL OF
THE CITY OF DUBLIN VOCATIONAL EDUCATION COMMITTEE.

PEMBROKE TECHNICAL INSTITUTE (Ringsend and Ballsbridge)
General Commercial Subjects. Mechanical Engineering.
Languages. Oxy-Acetylene Welding.
Domestic Science and Housecraft. Building Trades.
Art and Art Crafts.
Day School of Commerce.
Day Junior Technical School.

RATHMINES TECHNICAL INSTITUTE.
Accountancy, Auditing and Allied Subjects.
Insurance.
Advertising and Publicity.
Physical Training.
Domestic Science and Housecraft.
Day School of Commerce.
Day Trades Preparatory Course (Girls).

MARINO TECHNICAL INSTITUTE.
General Commercial Subjects. Metalwork.
Languages. Science.
Domestic Science and Housecraft. Woodwork.
Physical Training.
Day Junior Technical School.
Day School of Commerce.
Day Trades Preparatory Course (Girls).

CHATHAM ROW SCHOOL OF MUSIC (Day and Evening Classes)
Pianoforte. Wind Instruments (Wood & Brass).
Violoncello. Fifes.
Uileann and Irish War Pipes. Viola.
Elcution. Orchestra.
Violin. Drums and Flute.
Singing and Choir. Traditional Music.
Organ. Irish Harp.

Offices—
TECHNICAL INSTITUTE,
BOLTON STREET,
DUBLIN.

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