

Moved by Dr. Eve and seconded by Mr. Dobson :-

"That with a view to providing specially trained Scientists capable of proceeding to advanced Scientific or Industrial Research, it is, in the opinion of the Associate Committee, desirable to have offered in such Universities of Canada as are able to provide the necessary facilities, a Scientific Course which shall contain a combination on the one hand of Mathematics and Physics with some Chemistry, and on the other hand of courses in Electrical or other branches of Engineering."

"That in the opinion of the Associate Committee this course should be given in a period of 5 years with the degree of B.Sc. or its equivalent at the end of the fourth year and the degree of M.Sc. or its equivalent at the end of the fifth year."

A new course for the training of Students in
Engineering Physics.

At McGill University the existing course in the Faculty of Applied Science is an excellent one for the preparation of students to become Electrical Engineers.

In the Faculty of Arts the existing Honours course is likewise admirably adapted for sound training in Mathematics or in Physics or in Mathematical Physics. The proposed new course will not replace or interfere with these established courses.

There is however an existing demand for Physicists with a more extended knowledge of practical problems, particularly electrical; and for engineers with a wider and more powerful grasp of Mathematics and of the principles of Physics.

McGill Graduates such as Dr. L.V. King, Dr. R.W. Boyle, and Mr. E.L. Bieler have already received with great benefit the double training indicated above and it is believed that Professors, Lecturers, Laboratories and apparatus are already fully available at McGill, without involving the University in extra outlay.

The work required in the future from Physical Engineers may be summarised as follows :

- (a) To train a body of able men capable of filling the chairs of Professors in Canadian Universities who shall have a wide outlook and a sound knowledge of those domains where Mathematics, Physics and Electrical or other Engineering interact. A man well trained under the new course in Engineering Physics should be capable in due course of filling a chair in Mathematics or Physics or Electrical Engineering.
- (b) To institute a class of highly trained engineers who are capable of overcoming the difficulties and improving the practice in Electrical Power Generation and Distribution.
- (c) A large number of young men is required for the Research Laboratories of General Electric Co., Western Electric, and similar companies. These companies want men with sound knowledge of mathematics and physics and with engineering or mechanical training, in fact they need Physical Engineers.
- (d) If a Research Institute is founded at Ottawa a considerable staff of able young men will be required. There are at present few available in Canada, and if those available are withdrawn from the Universities the result to Education would be serious.
- (e) The discovery and development of electronic valves have opened up new regions to Physicists and Electrical Engineers. Telephony, Wireless Telegraphy and Telephony on land, on sea, under sea, in air, are alike already affected by the use of valves and amplifiers. There is and will be a demand for well trained men, not amateurs, for the Radio-Telegraph Branch of the Naval Service and for the Marconi Wireless Telegraphy Company of Canada, Canadian General Electric Co., and Northern Electric Co.

The chief danger is that our best men when trained will be induced by higher salaries, and better facilities, to leave Canada and go to the United States.

It should be clearly understood that good mathematical ability and enthusiasm for Physics and a fondness for experimental work are essential requisites for a Physical Engineer.

It is therefore recommended by Dr. L. Herdt, Professor of Electrical Engineering, by Dr. A.S. Eve and Dr. L.V. King Macdonald Professors of Physics that a course shall be approved, to commence 1st October 1920, for the training of Physical Engineers.

Students who have shown good ability in Mathematics and Physics in the Faculty of Arts or Faculty of Science should be admitted to such course next Session.

Details are set forth in Appendix 1 and Appendix 2.

The above is respectfully submitted for consideration to the Governors, Principal, Corporation, Faculty of Arts and Faculty of Science, with a view to bringing the scheme into operation in October 1920.

APPENDIX 1.

The course in Physical Engineering shall be open to Students in Arts entering their Third or Higher Year provided they have satisfactorily passed in the following pre-requisites

Mathematics	2, 4, 5.
Physics	1, 3, 4, or 2, 3, 4.

Third Year.

Arts, Mathematics 7, 12.	p.141
Arts, Physics, 5, 6, 12, 13	p.151
Science Electrical Engineering 113, 114	p.196

During their summer vacation (end of Second Year) the Student should spend three months at an approved shop or station (radio).

Fourth Year.

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and proceed to the degree of B.Sc., Summer Thesis or Shop work. In their Fifth Year the student should take the whole of the Fourth Year Course for Electrical Engineering (page 196) and also Physics 14, 15 or 17, as 9 has already been taken, and proceed with research work and thesis with a view to M.Sc. degree.

The course must therefore cover five years and should cover six. During the last year (sixth) opportunity would usually occur to act as demonstrator with a salary.

APPENDIX 2.

A student who has completed his Second Year in the Faculty of Applied Science and has received first or second class rank in Mathematics and Physics may join the course for Engineering Physics.

His course is identical with that set out in Appendix 1.

Report of the Committee of the Board of Graduate Studies on a proposed Course in Engineering Physics.

The Committee recommends that :

"A degree of B.Sc. (Arts) Honours in Mathematics and Physics, can be obtained through the proposed course at the end of four years.

A degree of M.Sc. in Engineering Physics may be obtained by following the course for a fifth year, if a suitable thesis is presented and approved by the Committee of Graduate Studies."

The course received the Sanction of the Corporation of McGill University in October 1920.

COURSE IN PHYSICS AND ENGINEERING - QUEEN'S UNIVERSITY

Any student who has taken the first two years' work and has shown marked ability in Mathematics and Physics may take up the work of this course at the beginning of the third year.

First Year.

English
Mathematics (Algebra, Solid Geometry, Solid and Co-ordinate Geometry)
Astronomy
Physics (Mechanics, Electricity, Magnetism, Sound, Light, Heat.)
Projections (An elementary class in Descriptive Geometry.)
General Chemistry
Drawing
Surveying

Second Year.

Mathematics (Differential and Integral Calculus)
Astronomy (Spherical Trigonometry and Applications)
Physics (Mechanics of Rotation and Electricity and Magnetism)
Chemistry (Qualitative Analysis)
General Engineering (Knowledge of Materials)
Kinematics of machines
Drawing
Surveying
Workshop

During the summer, between the second and third years the student is supposed to engage in work in some industrial plant approved by the Faculty.

Third Year.

Physics (Elementary Mathematical Theory of Electricity and Magnetism, Elementary Theoretical Mechanics, Thermodynamics, and a short course on Radiation, Conduction through Gases and Radioactivity)
Chemistry (Quantitative Analysis)
Metallurgy (Iron and Steel)
Electrical Engineering (Alternating Currents)
Economics
French or German.

In the summer the student is supposed to spend at least three months in a works or laboratory and, if possible, on some work connected with research.

Fourth Year.

Physics (Mechanics of Rigid and Elastic Bodies
Physical Optics, Electrodynamics and
Kinetic Theory of Gases.)

Mathematics (Analytical Solid Geometry and Differen-
tial Equations)

Physical Chemistry

Economics

German or French (being the language not selected in
the third year.)

The degree B. Sc., is awarded on the completion of the above course. For the student who wishes to continue, a fifth year is offered, in which advanced work in Physics and Mathematics or Chemistry with Electrical Engineering or some other branch of engineering is taken. During this year, the student must engage in research, the results of which are submitted in a thesis. On the completion of the work of this year the degree of M. Sc is awarded. An arrangement is made so that a student who needs to do so may become a demonstrator in the laboratory and spread the work of this fifth year over two Calendar years.

The work of the first two years is entirely in the Faculty of Applied Science. The Mathematics and Physics classes of the third, fourth, and fifth years are the regular Arts Honour classes, while the remaining classes are in the Faculty of Applied Science. Thus, the adoption of the course has required no new classes.

September
Thirtieth
1930.

Professor James Harkness,
Arts Building.

Dear Professor Harkness:-

I know that Dr. Eve has
spoken to you with reference to a new course in
Engineering Physics.

I consider it wise that such a
course have the formal approval of Corporation
before any announcement is made that such a course
may be established, and have written Dr. Eve
accordingly. I would like you to call a meeting
of the Committee on Graduate Studies and discuss
the matter. I hope that when it is considered
by Corporation it may be said that it has the
approval of your Committee.

Yours faithfully,

CC-Dr. Nicholson.

Principal.

September
Thirtieth
1920.

Dr. A. S. Eve,
Physics Building.

Dear Dr. Eve:-

I have carefully considered your letter of the 28th instant, together with the Memoranda you have prepared on the new course in Engineering Physics.

I have decided to let this matter be dealt with in the regular way, namely that it be brought before Corporation for their approval before any announcement is made of its authorization. Will you please prepare the argument for its presentation to Corporation. The meeting of that body takes place on October 13th next. As you are not a member of that body, I am asking the Secretary, Dr. Nicholson, to arrange for hearing you.

It seems to me that as the teaching of the required subjects is already arranged for, that the delay in the authorization of the course until after the meeting of Corporation will not be a serious matter. I entirely approve of the new course, but wish to be assured that it can be arranged for without any increase in cost to the University.

I shall ask Dr. Harkness to call a meeting of the Committee on Graduate Studies to take up this question, and hope that when Corporation deals with it they may be confronted by the formal approval of the Committee on Graduate Studies.

Yours faithfully,

Principal.

McGILL UNIVERSITY
MONTREAL

THE MACDONALD PHYSICS BUILDING

28.9.20

Dear Sir Arthur,

Engineering Physics.

If the new course is to be started
some publicity will be required, and quickly.

I am glad to learn that Prof Harkness,
Prof. of Math^s, and Chairman of the
Committee of Graduate Studies thinks
highly of this scheme and thinks that
it should go forward with some
minor amendments.

Would you please look at the
enclosed, and if approved have
copies sent to the Editors of

Montreal Gazette

" Star
McGill Daily

Evening Post

Adviser

A NEW SOURCE IN ENGINEERING PHYSICS.

There is at present, and there is likely to be for many years, a lack of men who can fill responsible positions in research work and in pioneer development in the great Electrical Companies such as the General Electric, Western Electric, Northern Electric, Bell Telephone, Marconi, and Research Institutes.

At the same time there are not enough men to fill the professorships in Mathematics, or in Physics, or in Electrical Engineering, in the Universities of Canada, and elsewhere.

Thus there is a great opportunity for young men of ability, who receive proper training.

In particular the development of the Electron tube or thermionic valve has opened new fields in radio telegraphy and telephony, and in the so-called "wired-wireless"; when radio frequency messages are added to low frequency signals on the same cables.

It is the duty of the Universities to train competent men to carry forward this work and in particular to secure sufficient able men to fill the professorial chairs, without which education and progress in Canada must be arrested. There is happily a determined effort to improve the financial status of Canadian Professors in the future.

The new course will be open to Students in Applied Science who have completed their first two years and obtained First Class standing in Mathematics and Physics.

It will also be open to Students in Arts who have been distinguished in the Honour Courses in Mathematics and Physics, after two years at McGill.

The course itself will be a judicious blend of the training in ~~Electrical~~ Engineering and in the Honour course of Mathematics and Physics.

Such a training is no new thing; for several distinguished men have already received it at McGill, such as Dr. L.V. King, Dr. R.W. Boyle of the University of Alberta, who did such ~~distinguished~~ *excellent* war work in Applied Physics, and Mr. E.S. Bieler who has just gone to Cambridge with an 1881 Exhibition.

The new course has not yet received sanction from the Corporation of the University, but there is no reason why suitable men should not begin their work at once at the opening of the session, as they will be following approved courses.

It is hoped that a B.Sc. may be granted at the end of the fourth year and an M.Sc. at the end of the fifth year, if a suitable thesis is presented.

Students wishing to enter the course may consult Professor L.S. Herât, or Professor A.S. Eve, in person or by letter without delay.

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Copy to the Principal

McGILL UNIVERSITY.
Montreal.

Macdonald Physics Building.

September 2 1920.

Dr. F. D. Adams,

Dear Dr. Adams,

I am grateful to you for your helpful criticisms (19 Aug.) about a Course in Engineering Physics.

- (1) The shortage of suitably trained men is so grievous that I trust a way may be found of starting this scheme at least provisionably, at the beginning of the coming session. *(1920-21)*
- (2) The Honour Courses in Physics are of an elastic character and no time-table difficulties seem likely to occur.
- (3) B.Sc would perhaps be more suitable than B.A.
- (4) Six hours work per week (Electrical Measurements Course) is taken in the previous year, and 4 hours lectures (Courses 14 and 15) are substituted.

I do not think that this course can be recommended to men who have not ability above the average, However.

- (5) The question of M.Sc should certainly be brought before the Committee on Graduate Studies.

Yours sincerely
A. S. M.

McGILL UNIVERSITY

MONTREAL.

THE MACDONALD PHYSICS BUILDING.

2.9.20

Dear Sir Arthur,

I forward herewith
my answer, or rather a copy
of it, to the suggestions made
by Dr Adams with reference to
the proposed course in Engineering
Physics.

I will send the scheme &
copies of letters to the Chairman,
Committee on Graduate Studies.

Yours sincerely

Adve

File

Dr Arthur Curie -

MEMORANDUM CONCERNING NEW COURSE FOR TRAINING OF STUDENTS IN
ENGINEERING PHYSICS SUGGESTED BY PROFESSOR EVE, PROFESSOR HERDT,
AND PROFESSOR KING.

1. The request is made that the above proposal be submitted to the Governors, Principal, Corporation, Faculty of Arts and Faculty of Applied Science, with a view to bringing the scheme into operation on October 1st, 1920. Neither the Corporation or the Faculty of Arts, or the Faculty of Applied Science hold meetings before that date, and it is therefore impossible to have the matter brought before them for consideration and approval so that the scheme may come into operation with their approval on the date in question.

2. This is a composite course, consisting of certain subjects taken from the curriculum of the Faculty of Arts and certain others from the curriculum of the Faculty of Applied Science, and in the memorandum it is stated that the course may be carried out "without involving the University in extra outlay." Have the timetables of the two Faculties been studied so that we know it will be possible to make up this joint course without the repetition of any courses of lectures or laboratory periods?

3. What degree is it proposed to give the man who graduates in this new course? I gather that the degree is that of Bachelor of Arts. The course, however, is essentially a science course in Electrical Engineering and Mathematics. Would not the degree of Bachelor of Science be more appropriate?

4. How can a man take in his Fifth Year the whole course of the Fourth Year in the Department of Electrical Engineering, together with Courses fourteen and fifteen in the Department of Physics, and in addition to this carry out research work and write a Thesis?

5. If he could find time to do all the work set forth under 4 in the single session, the proposed course would not fall in line with the present requirements for the degree of Master of Science, and this matter should therefore be brought to the attention of the Committee on Graduates Studies.

August
Sixteenth
1920.

Dr. A. S. Eve,
Physics Building.

Dear Dr. Eve:-

I have read with much interest the Memorandum attached to your letter of August 7th, and have been greatly impressed regarding the necessity of the institution of the new course for the training of students in Engineering Physics, as therein outlined.

The chief difficulty, it seems to me, would be in the arrangement of the Time Table of the Arts and Science courses in order that this new course might be provided for. As there is no Dean of the Faculty of Arts here, nor is there anyone who in particular deals with Arts matters other than Dr. Nicholson, who is at present away on leave, I fear that some delay is unavoidable.

I would appreciate very much if if you would come in to my office some morning and we might discuss the matter further.

Yours faithfully,

Principal.

McGILL UNIVERSITY
MONTREAL.

THE MACDONALD PHYSICS BUILDING.

7. 8. 20

Dear Sir Arthur,

Would you please look
at the enclosed scheme which
I am anxious to have from
Cooperator, Faculty of Arts,
Faculty of Applied Science, should
such a course meet with your
approval.

Yours sincerely

Arthur

To the Principal

McGill University

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Arts Physics 8, 9, 10, 11, 15 or 17	p.151

and proceed to the degree of B.A. Summer Thesis or Shop work. In their Fifth Year the student should take the whole of the Fourth Year Course for Electrical Engineering, also Physics

14, & 15 or 17, as 9 has already been taken (p.196) and proceed with research work and thesis with a view to M.Sc. degree.

The course must therefore cover five years and should cover six. During the last year (sixth) opportunity would usually occur to act as demonstrator with a salary.

APPENDIX 2.

A student who has completed his Second Year in the Faculty of Applied Science and has received first or second class rank in Mathematics and Physics may join the course ~~for~~ in Engineering Physics. His course is identical with that set out in Appendix 1.