

306-639B MANAGEMENT TECHNIQUES FOR ENGINEERING SERVICES OF MINING PROJECTS. (3) Project phases: preparation of proposals, feasibility studies, tender documents, instrumentation and monitoring during mine development. Project controls: organization charts, scheduling, quality assurance and control, site inspection. Engineering services: budget and manpower, performance analysis, maintenance and filing, policies and administrative procedures. **Dr. Keira**

306-640D ADVANCED MINERAL PROCESSING. (6) Modern advances in mineral processing techniques. The student will prepare a series of reports covering developments in mineral processing. **Professors Finch and Laplante**

306-650D TRANSPORT PHENOMENA IN PROCESS ENGINEERING METALLURGY. (6) Metallurgical applications of heat, mass and momentum transfer theories. Particular emphasis is placed on the applications of computational fluid dynamics and development of appropriate software programs. These are based on the integral control volume, finite difference approach, employing body-fitted co-ordinate schemes to handle arbitrarily shaped flow domains. Turbulence models such as K-E and large eddy simulation are presented. **Professor Hasan**

306-652B AQUEOUS PROCESSING. (3) Advanced treatment of the chemical and engineering principles governing aqueous dissolution, purification and deposition operations. Topics include: ionic activities of dilute and concentrated solutions; solution and solid-liquid equilibria; analysis of complexation and redox reactions; high temperature solution thermodynamic kinetics; solvent extraction, equilibria and mass transfer kinetics; nucleation, growth and agglomeration phenomena in aqueous precipitation systems. **Professor Demopoulos**

306-653A,B TRANSPORT PHENOMENA IN PROCESS METALLURGY. (3) Process metallurgical applications of heat, mass and momentum transport theories. Methods of numerical solution in the analysis of: continuous casting, ingot solidification, soaking pits, hot mill operations, alloy addition methods in steel-making, etc. Students are assigned individual computer projects and present a report plus a seminar on their findings. **Professor Hasan**

306-657A ADVANCED EXTRACTIVE METALLURGY. (3) Field trips focusing on non ferrous metallurgy: energy considerations and minor elements in production and refining of aluminum, copper, gold, titania slag, zinc and other metals. Advanced technology and process design. Visits will reflect instructor's and students' interests. **Professor Harris**

306-670D RESEARCH SEMINAR. (6) For students registered for a Master's degree in Metallurgy. **Metallurgy Staff**

306-672D ROCK MECHANICS AND GEOPHYSICS SEMINAR. (6) Theoretical and practical aspects of ground control practice using the case study method. **Professor Hassani**

306-673D,N,E,G MINING ENGINEERING SEMINAR. (6) For students registered in the Graduate Diploma or Master's programs in Mining. **Professor Mitri**

306-680D,E,G METALLURGICAL/MATERIALS ENGINEERING PROJECT I. (6)

306-681D,E,G METALLURGICAL/MATERIALS ENGINEERING PROJECT II. (6)

306-682A,B,C METALLURGICAL/MATERIALS ENGINEERING PROJECT III. (3)

306-690D,N,E,G,B THESIS RESEARCH I. (6)

306-691A,B,L THESIS RESEARCH II. (3)

306-692D,N,E,G,B THESIS RESEARCH III. (6)

306-693A,B,L THESIS RESEARCH IV. (3)

306-694D,N,E,G,B THESIS RESEARCH V. (6)

306-695A,B,L THESIS RESEARCH VI. (3)

306-701A,B,C,T PH.D. THESIS RESEARCH PROPOSAL (0) For students registered in a Ph.D. program in Metallurgy. Student submits a document and takes an oral examination to demonstrate familiarity with relevant literature, define a methodology and describe a work plan. **Metallurgy Staff**

306-771D RESEARCH SEMINAR. (6) For students registered in a Ph.D. program in Metallurgy. **Metallurgy Staff**

306-776D MINING RESEARCH SEMINAR. (6) For students registered in a Ph.D. program in Mining. **Professor Mitri**

Undergraduate Courses

The following undergraduate courses are available to graduate students who have not taken an equivalent course. Please consult the Undergraduate Programs Calendar for descriptions.

306-200A MINING TECHNOLOGY. **Mr. Mossop**

306-320B EXTRACTION OF ENERGY RESOURCES. **Professor Hassani**

306-322B ROCK FRAGMENTATION. **Mr. Comeau**

306-323B ROCK AND SOIL MASS CHARACTERIZATION. **Professor Hassani**

306-419C OR T SURFACE MINING. **Mining Staff**

306-420B FEASIBILITY STUDY. **Mr. Mossop and Professor Bilodeau**

306-426C OR T DEVELOPMENT AND SERVICES. **Mr. Mossop**

306-341B INTRODUCTION TO MINERAL PROCESSING. **Professor Finch**

52 Music

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Strathcona Music Building
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Fax: (514) 398-8061

Website: <http://www.music.mcgill.ca>

Dean, Faculty of Music — Richard Lawton

*Associate Dean (Academic) and
Chair, Committee on Graduate Studies* — Don McLean

Chair, Department of Theory — Wieslaw Woszczyk

Chair, Department of Performance — Gordon Foote

Associate Dean (Information, Systems and Technology) — Bruce Minorgan

52.1 Staff

Emeritus Professors

Bengt Hambræus; Fil Kand(M.A.), Fil Lic(Ph.D.), Fil Dr.(Hon.C.) (Uppsala); F.R.A.M.(Sweden)

Kelsey Jones; L.Mus., B.Mus.(Mt.All.), B.Mus., Mus.Dc.(Tor.)

Dorothy Morton; Graduate, Conservatoire de Musique de Québec

Professors

Brian Cherney; Mus.Bac., Mus.M., Ph.D.(Tor.)

Robert Gibson; B.S., M.F.A., Ph.D.(Minn.)

John Grew; L.T.C.L.(Lond.), B.Mus.(Mt. All.), M.Mus.(Mich.)

D.D.(U.T.C.); LL.D.(Mt.All.); University Organist

Alcides Lanza; Graduate, Instituto Torcuato Di Tella(Buenos Aires)

Bruce Mather; B.Mus.(Tor.), M.A.(Stan.), Mus.Doc.(Tor.)

Bruce Pennycook; B.Mus. M.Mus.(Tor.), D.M.A.(Stan.)

John Rea; B.Mus.(Wayne St.), M.Mus.(Tor.), M.F.A., Ph.D.(Prin.)

Charles Reiner; Graduate, Conservatoire de Genève

Wieslaw Woszczyk; M.A., Ph.D.(F. Chopin Academy of Music, Warsaw)

Associate Professors

Dale Bartlett; A.R.A.M.(Lond.), LL.D.(Leth.)

Theodor Baskin; B.Mus.(Curtis), M.Mus.(Auck.), Principal Oboe, Montreal Symphony

Pierre Béluse; Graduate, Conservatoire de Musique de Québec

William Caplin; B.M.(S.Calif.), M.A., Ph.D.(Chic.)

Eugenia Costa-Giomi; Profesora Superior de Musica (National Cons., Buenos Aires), Ph.D.(Ohio)
 Julie Cumming; B.A.(Col.), M.A., Ph.D.(Calif.)
 Kevin Dean; B.M.E.(Iowa), M.Mus.(Miami)
 Iwan Edwards; B.Mus.(U.Coll. of Wales)
 Lucile Evans; Dip.(Vincent d'Indy)
 Gordon Foote; B.Sc., M.A.(Minn.)
 Paul Helmer; B.A.(Tor.), M.A., Ph.D.(Col.)
 Steven Huebner; B.A., B.Mus., L.Mus.(McG.), M.F.A., Ph.D.(Prin.)
 Timothy Hutchins; Dip. L.G.S.M.(Guildhall), B.A.Hons.Mus.(Dal.),
 Principal Flute, Montreal Symphony
 Jan Jarczyk; B.A., M.A.(Academy of Music, Cracow),
 Dip.(Berklee)
 Abe Kestenbergl
 Hank Knox; B.Mus., M.Mus.(McG.)
 Richard Lawton; B.Mus.(McG.), M.Mus.(Ind.)
 Tamara Levitz; B.Mus.(McG.), M.A.(Technische Universität,
 Berlin), Ph.D.(Eastman)
 Antonio Lysy; P.P.(Royal Northern Coll.), Dip.(Menuhin Academy,
 Gstaad), Performer's Dip.(Maast. Cons., Nether.)
 Don McLean; Mus.Bac., M.A., Ph.D.(Tor.)
 Douglas McNabney; B.Mus.(Tor.), M.M.(W.Ont.),
 Mus.Doc.(Montr.)
 Marina Mdivani; Post-graduate Dip.(Moscow Cons.)
 Bruce Minorgan; B.Mus.(Br.Col.), M.A.(Tor.)
 William Neill; B.Mus., M.Mus.(Texas at Austin)
 Louis-Philippe Pelletier; Premier Prix (Conservatoire de Musique
 de Québec)
 Tom Plaunt; B.A.(Tor.), Graduate, Nordwestdeutsche
 Musikakademie (Detmold, Germany)
 Eugene Plawutsky; Graduate, Conservatoire de Musique de
 Québec, L.Mus., B.Mus.(McG.), M.A.(Tor.)
 Peter Schubert; B.A., M.A., Ph.D.(Col.)
 Jan Simons
 Eleanor Stuble; B.Mus.(Tor.), M.Mus.(Bran.), Ph.D.(Illinois)
 Bernard Turgeon; Dip.(Toronto Opera School), Dip.(R.C.M.),
 Dip.(Vienna Staatsoper)
 Timothy Vernon; Graduate, Hochschule für Musik(Vienna),
 Dip.(Academmmia Chigiana, Italy), Dip.(Mozarteum, Salzburg)
 Joel Wapnick; B.A.(N.Y.), M.A.(S.U.N.Y.), M.F.A.(Sarah L.),
 Ed.D.(Syr.)
 Thomas Williams; B.Mus.(Bran.)
 John Zirbel; B.Mus.(Wis.), Principal Horn, Montreal Symphony
 Luba Zuk; L.Mus.(McG.), Graduate, Conservatoire de Musique de
 Québec

Assistant Professors

Yehonatan Berick; B.Mus., Artist Dip.(Cinn.)
 Denys Bouliane; B.Mus., M.Mus.(Laval)
 Philippe Depalle; B.Sc.(Paris), D.E.A., Ph.D.(Maine, Le Mans)
 John Klepko; B.F.A.(C'dia.), M.Mus., Ph.D.(McG.)
 Richard Roberts; B.Mus.(Ind.); Concertmaster, Montreal
 Symphony
 Dixie Ross-Neill; B.Mus.(N. Carolina), M.Mus.(Texas)
 Marcel Saint-Cyr; B.A.(Laval), Premier Prix (Cons. de Mus. de
 Qué.), Concert Dip.(Hochschule für Musik, Karlsruhe)
 Peter Sullivan; Principal Trombone, Montreal Symphony
 André White; B.A.(C'dia.), M.Mus.(McG.)

52.2 Programs Offered

The Master of Arts degree (M.A.) is available as a thesis option in Music Education, Music Technology, Musicology, and Theory and as a non-thesis option in Music Education, Musicology, and Theory.

The Master of Music degree (M. Mus.) is available in Composition, Performance, and Sound Recording. Within the Performance option are offered specializations in: piano, guitar, orchestral instruments, organ, conducting, chamber music, orchestral training, piano accompaniment, vocal, opera, vocal pedagogy, early music, church music - organ, and jazz.

The Doctor of Music degree (D.Mus.) is offered in Composition while the Doctor of Philosophy degree (Ph.D.) is available in Music

Education, Musicology, Music Technology, Sound Recording and Theory. Interdisciplinary studies involving Musicology or Theory are encouraged. A D.Mus. in Performance (currently ad hoc) is under development.

There are opportunities for graduate students to obtain funding by being hired as assistants through the Faculty of Music. Positions are available as: teaching assistants, apprentice writers for program notes and Music McGill, sound recording technicians, dubbing technicians, correctors, and invigilators. Inquiries should be directed to the Chair of the Department of Theory or the Chair of the Department of Performance, as appropriate.

52.3 Admission Requirements

Masters' Degrees

Applicants for the Master's degree must hold a B.Mus. or a B.A. degree with a Major or Honours in Music including considerable work done in the area of specialization.

All applicants (except those for performance and sound recording) will be required to take placement examinations. Applicants found to be deficient in their background preparation may be required to take certain additional undergraduate courses.

Applicants to the Composition, Music Education, Music Technology, Musicology, Sound Recording, and Theory programs are requested to submit samples of work done in their special area.

Applicants to the Music Education program should normally have had two years of teaching experience.

All applicants to the Performance program will be required to pass an entrance audition. Only those applicants who clearly demonstrate the potential to become professional performers on their instruments will be admitted.

Applicants to the Vocal Pedagogy option should have a minimum of three to four years experience in studio teaching.

A reading knowledge of German is strongly recommended as a prerequisite for graduate work in Music Education, Musicology, and Theory.

Prerequisite Undergraduate Courses for M.Mus. – Sound Recording

In order to be considered for admission to the Master of Music in Sound Recording, students must attain a minimum grade of B in all of the courses listed below and must have a B.Mus. degree with a minimum CGPA of 3.00

Faculty of Music

213-260A Instruments of the Orchestra
 216-202A Fundamentals of New Media
 216-203B Introduction to Digital Audio
 216-232A or B Introduction to Electronics
 216-300D Introduction to Music Recording
 216-339A or B Introduction to Electroacoustics

One of (Complementary):

216-302A New Music Production I
 216-306A Music & Audio Computing I

Faculty of Science

198-224A Physics and Psychophysics of Music
 198-225B Musical Acoustics

Prerequisite Undergraduate Courses for M.Mus. – Performance

Piano Accompaniment

An undergraduate major in Piano.

214-570 Research Methods in Music

One of:

214-372A or B Solo Song outside Germany & Austria
 214-390A or B The German Lied

Two of:

242-210A Italian Diction (or equivalent)
 242-211B French Diction (or equivalent)
 242-212A English Diction (or equivalent)
 242-213B German Diction (or equivalent)

Orchestral Conducting

213-260A Instruments of the Orchestra
 213-261B Elementary Orchestration
 213-460D Orchestration
 214-389A or B Orchestral Literature
 214-570 Research Methods in Music
 223-201A String Techniques
 223-202A Woodwind Techniques
 223-203A or B Brass Techniques
 223-204A or B Percussion Techniques
 242-315D Introduction to Orchestral Conducting (or equivalent)

Choral Conducting

129-202D German
 213-260A Instruments of the Orchestra
 213-261B Elementary Orchestration
 214-397A or B Choral Literature after 1750
 214-570 Research Methods in Music
 221-415B Choral Conducting II (or equivalent)
 253-130A or B Voice Concentration

Wind Band Conducting

An undergraduate major in Wind or Percussion instruments
 213-260A Instruments of the Orchestra
 213-261B Elementary Orchestration
 214-398A or B Wind Ensemble Literature after 1750
 214-570 Research Methods in Music
 223-202A Woodwind Techniques
 223-203A or B Brass Techniques
 223-204A or B Percussion Techniques
 223-415B Instrumental Conducting II (or equivalent)

Early Music (Voice students only)

214-570 Research Methods in Music
 Two of:
 242-210A Italian Diction (or equivalent)
 242-211B French Diction (or equivalent)
 242-212A English Diction (or equivalent)
 242-213B German Diction (or equivalent)

Jazz Performance

214-393A or B History of Jazz
 240-440D Advanced Jazz Composition
 240-461D Advanced Jazz Arranging
 240-493A or B Jazz Performance Practice

D.Mus. Degree

Applicants for the D.Mus. degree must hold an M.Mus. degree in Composition, or its equivalent, and must submit scores and/or tapes of their compositions at the time of application.

Ph.D. Degree

Applicants for the Ph.D. degree must hold an M.A., or a Bachelor's degree equivalent to a McGill Honours degree, in Music Education, Music History, or Theory. Applicants with a Bachelor's degree will normally be admitted to the M.A. program for the first year and may apply for admittance to the Ph.D. program after the completion of one full year of graduate course work. Qualified applicants who have already completed an appropriate Master's degree will be admitted to the second year of the program.

52.4 Application Procedures

Applications will be considered upon receipt of:

1. application form;
2. transcripts;
3. letters of reference;
4. \$60 application fee;
5. \$40 audition fee;
6. submissions appropriate to area of specialization;
7. TOEFL test results.

All information is to be submitted to Vernoica Slobodian, Admissions Officer, Faculty of Music.

Deadline date for submission of application and accompanying documentation is January 15.

All applicants are requested to submit samples of their work completed during their previous studies. Those applying for the first time will be required to take placement examinations.

52.5 Program Requirements**Masters' Degrees**

The minimum residence requirement for Masters' programs is 1½ years (3 full-time terms); for Sound Recording, 2 years (4 full-time terms). In all programs a minimum number of formal courses are prescribed. The student's major work is expected to be thesis, research, composition or performance which will be done under the supervision of an adviser. This work, as well as any additional courses and/or individual study which the Department considers necessary, constitutes the central part of each program.

Applicants who hold the equivalent of a McGill B.Mus. with Honours in the area of specialization may be able to complete the Master's degree in less than two years.

Master of Music – Composition (thesis) (48 credits)

213-622D Composition Tutorial.
 Two of 213-631A, 213-632B, 213-633A, 213-634B, 213-635A, 213-636B Seminar in 20th-Century Music.
 Two approved 3-credit electives or the equivalent.
 Language reading examination in one of: French, German, or Italian. Students whose mother tongue is French are exempt from the French Language Reading examination.
 Thesis (30 credits). The thesis is a composition, accompanied by an analytical essay of approximately 20 to 30 pages.

M.A. in Music – Music Education (thesis) (48 credits)

Five 3-credit courses approved by the Department, normally three of these will be Seminars in Music Education.
 Thesis (33 credits). The candidate will undertake supervised research leading to a thesis which will be an in-depth investigation in some specialized field of music education.

M.A. in Music – Music Technology (thesis) (48 credits)

216-605A or B Digital Sound Synthesis & Audio Processing.
 Two of 216-610A, 216-611B, 216-612A, 216-613B, 216-614A, 216-615B Computer Music Seminar.
 Two 3-credit electives, approved by the Department.
 Thesis (33 credits). The candidate will undertake supervised research leading to a thesis which will utilize or investigate computer applications in one of the following areas of music study and practice: performance, jazz, sound recording, theory, composition, music education, musicology.

M.A. in Music – Musicology (thesis) (48 credits)

Four 3-credit courses approved by the Department, normally at least two of these will be Seminars in Musicology.
 214-529 Proseminar in Musicology.
 Thesis (33 credits). The candidate will undertake supervised research leading to a thesis which will be an in-depth investigation in some specialized field of musicology.

Master of Music – Sound Recording (thesis) (60 credits)**Required Courses (51 credits)**

216-629D (4) Technical Ear Training
 216-667A or B (3) Digital Studio Technology
 216-668A or B (3) Digital/Analog Audio Editing
 216-669A or B (3) Topics - Classical Music Recording
 216-670D (10) Recording Theory & Practice I
 216-671D (10) Recording Theory & Practice II
 216-672D (6) Analysis of Recordings
 216-674A or B (3) Electronic and Electroacoustic Meas.
 216-677D (6) Audio for Video Post-Production
 216-678B (3) Advanced Digital Editing and Post-Production

Elective Courses (9 credits)

three 3-credit graduate electives

Note: A reorganization of the program under the designation "Music, Media and Technology" is currently under consideration.

M.A. in Music – Theory (thesis) (48 credits)

Five 3-credit courses approved by the Department, normally three will be Seminars in Music Theory and either 211-658 History of Music Theory I or 211-659 History of Music Theory II Thesis (33 credits). The candidate will undertake supervised research leading to a thesis which will be an in-depth investigation in some specialized field of music theory.

Non-thesis M.A. in Music (options in Music Education, Musicology, and Theory) (45 credits)

Seven 3-credit courses approved by the appropriate Area, four of which must be in the Area itself.

For students in the Musicology Area, one of the courses must be 214-529 Proseminar in Musicology.

For students in the Theory Area, one of the courses must be 211-658 History of Music Theory I or 211-659 History of Music Theory II.

For students in Music Education, and with the approval of the Music Education Area, two of the seven 3-credit courses may be taken in the Faculty of Education.

219-614 Reading Course I and 219-615 Reading Course II.

219-635 Research Paper I and 219-636 Research Paper II.

Master of Music – Performance

Solo – Piano, Guitar, Orchestral Instruments, Organ, Conducting (45 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar.

Recitals:

242-660 Solo Recital I and 242-667 Solo Recital II (one of these could optionally include some chamber music).

(Wind Band Conducting – not available 1999-2000)

Master of Music – Performance

Chamber Music (48 credits)

(All instruments except Early Music Instruments, Organ and Double Bass.)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar.

Recitals:

242-661 Chamber Music Recital I and 242-668 Chamber Music Recital II (one of these could optionally include some solo music).

Ensembles:

Three terms of 243-660 Chamber Music Ensemble.

Master of Music – Performance

Orchestral Training – Orchestral Instruments (45 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar.

Recital/Exam:

242-660 Solo Recital I and 242-664 Repertoire Examination.

Ensembles:

Three terms of 243-697 Orchestra.

Master of Music – Performance

Piano Accompaniment (45 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar **or** 253-690A or B Vocal Styles & Conventions.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar.

Recital/Exam:

242-665 Accompanying Recital I and 242-663 Quick Study (to be successfully completed before the first recital is performed).

Ensembles:

Two terms of 243-679 Song Interpretation and 243-684 Studio Accompanying **or three terms** of 243-596 Opera Repetiteur.

Master of Music – Performance

Vocal Performance (49 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar **or** 253-690A or B Vocal Styles & Conventions.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar (this must have the prefix 253-).

Recitals:

242-660 Solo Recital I and 242-667 Solo Recital II.
253-600A and 253-601B Vocal Repertoire Coaching.

Master of Music – Performance

Opera Performance (45 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar **or** 253-690A or B Vocal Styles & Conventions.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar (this must have the prefix 253-).

Recital:

242-660 Solo Recital I and 242-658 Opera Performance Examination.

Ensembles:

Three terms of 243-696 Opera Theatre.

Master of Music – Performance

Vocal Pedagogy (47 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar **or** 253-690A or B Vocal Styles & Conventions.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar (this must have the prefix 253-).

Recital:

242-660 Solo Recital I.
242-611A, 242-612B, 242-613A Directed Teaching
242-650D Pedagogy Workshop.
253-600A or 253-601B Vocal Repertoire Coaching.

Master of Music – Performance**Early Music** (48 credits)

(Voice, baroque flute, recorder, baroque oboe, baroque violin, baroque viola, baroque cello, viola da gamba, harpsichord)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar.

Recitals:

242-660 Solo Recital I and 242-662 Solo and Chamber Music Recital.

Ensembles:

Three terms of 243-661 Early Chamber Music Ensemble.

Master of Music – Performance**Church Music - Organ** (45 credits)

242-620A, 242-621B, 242-622A Performance Tutorials.

One of 215-690A, 215-691B, 215-692A, 215-693B, 215-694A or 215-695B Performance Practice Seminar.

Electives:

One graduate 3-credit seminar with the prefix 211-, 213-, 214-, 215-, 219-, 222-.

One additional graduate 3-credit seminar.

Recital:

242-660D Solo Recital I.

Courses:

242-676D Special Project in Performance II

Ensembles:

Three terms of 243-493 Choral Ensemble.

Master of Music – Performance**Jazz Performance** (47 credits)

(Saxophone, Trumpet, Trombone, Drums, Piano, Guitar, Bass, Voice)

242-620A, 242-621B, 242-622A (1 hr./wk.) or 242-630A and

242-631B (1½ hrs./wk.) Performance Tutorials.

Recital:

242-660 Solo Recital I

242-659D Performance in Recording Media

Ensemble:

243-695A and B Jazz Ensemble.

Courses:

240-601A or B Jazz Pedagogy

240-640D Jazz Composition & Arranging

Courses approved as electives for M.Mus. students in Performance:

211-652A Seminar in Music Theory I

211-653B Seminar in Music Theory II

211-654A Seminar in Music Theory III

211-655B Seminar in Music Theory IV

211-656A Seminar in Music Theory V

211-657B Seminar in Music Theory VI

211-658A History of Music Theory I

211-659B History of Music Theory II

213-552A Computer Applications in Music

213-623A Electronic Music Seminar I

213-624B Electronic Music Seminar II

213-631A Seminar in 20th-Century Music I

213-632B Seminar in 20th-Century Music II

213-633A Seminar in 20th-Century Music III

213-634B Seminar in 20th-Century Music IV

213-635A Seminar in 20th-Century Music V

213-636B Seminar in 20th-Century Music VI

214-591D Paleography

214-653B Music Aesthetics and Criticism

214-680A Seminar in Musicology I

214-681B Seminar in Musicology II

214-682A Seminar in Musicology III

214-683B Seminar in Musicology IV

214-684A Seminar in Musicology V

214-685B Seminar in Musicology VI

214-692A Seminar in Music Literature I

214-693B Seminar in Music Literature II

214-694A Seminar in Music Literature III

214-695B Seminar in Music Literature IV

214-696A Seminar in Music Literature V

214-697B Seminar in Music Literature VI

215-690A Performance Practice Seminar I

215-691B Performance Practice Seminar II

215-692A Performance Practice Seminar III

215-693B Performance Practice Seminar IV

215-694A Performance Practice Seminar V

215-695B Performance Practice Seminar VI

222-610A Seminar in Music Education I

222-611B Seminar in Music Education II

222-612A Seminar in Music Education III

222-613B Seminar in Music Education IV

Doctor of Music (D.Mus.) Degree Requirements

A minimum of two years' residence is required beyond the M.Mus. in Composition, or its equivalent.

213-722D Doctoral Composition Tutorial (for two years).

Four approved 3-credit electives or the equivalent.

219-701D Doctoral Oral Comprehensive Examination and

219-702D Doctoral Written Comprehensive Examination.

Composition Performance. The candidate must present a concert of his/her compositions. With the permission of the Committee on Graduate Studies, the compositions may be presented as parts of two or three concerts.

Thesis. A musical composition of major dimensions together with a written analysis of the work. The thesis must be defended in an oral examination.

Details concerning the comprehensive examinations, composition performance, thesis and academic regulations are available from the Admissions Officer, Faculty of Music or the Secretary for Graduate Studies, Faculty of Music.

Ph.D. Degree Requirements

The Ph.D. requires a minimum of three years of full-time resident study (6 full-time terms) beyond a Bachelor's degree. A candidate who holds a Master's degree in the area of specialization may, on the recommendation of the Department, be permitted to count the work done for the Master's degree as the first year of resident study.

Ten 3-credit courses approved by the Department (the Doctoral Tutorial will be considered a course for purposes of this requirement). Applicants who have completed an M.A. degree before entering the Ph.D. program will be required to complete at least five approved 3-credit courses beyond the M.A. requirements.

Language reading examinations in two foreign languages (one foreign language for students in music education; none required for students in music technologies). Normally, one of these will be German and the other related to the candidate's field of research. A third language may be required if considered necessary for the candidate's research. Students whose mother tongue is French are exempt from the French Language Reading examination.

Comprehensive examinations, both written and oral. The language reading examinations must be passed before a candidate will be permitted to sit the Comprehensive Examinations.

Participation in 219-705D Colloquium.

Doctoral Dissertation. All courses and language requirements and the comprehensive examinations must be successfully completed before the dissertation is submitted.

52.6 Graduate Courses**Seminars**

Topics for graduate seminars vary from year to year and are normally chosen according to the individual instructor's areas of research expertise. A list of detailed seminar descriptions can be

obtained from the Secretary for Graduate Studies prior to fall registration. The following sampling of seminars given in recent years (though not necessarily to be offered in the upcoming year) indicate the scope of course offerings.

Seminar in Music Literature: The Music of Bela Bartok; The Symphonies of Beethoven; The Nineteenth-century French Symphony; The Choral Music of Johannes Brahms; French opera from Carmen to Pelléas

Seminar in Music Theory: Theory and Analysis of Classical Form; Mathematical Set and Group Theory Models; Theories of Musical Rhythm and Meter

Seminar in Musicology: Beethoven Style Periods; The "Roman de Fauvel"; The German Lied; Problems in Verdi Studies

Seminar in Performance Practice: Late Renaissance Performance Practice; Baroque Performance Practice; Performance Practice of the Beethoven Piano Sonatas

Seminar in Music Education: Music Criticism and Music Education; Musical Ability; Aesthetics, Music, and Music Education

Seminar in Twentieth Century Music: Music After 1945; The Symphony in the Twentieth Century; The Music of Olivier Messiaen

(Enrolment in seminars will normally be limited to 10.)

- Denotes not offered in 2000-01.

The course credit weight is given in parentheses (#) after the course title.

Not all courses listed below will be offered in 2000-01; for an up-to-date listing, please consult the final Music Graduate Course Timetable for 2000-01.

- 211-641A **ADVANCED COUNTERPOINT I.** (3) (2 hours)
- 211-642B **ADVANCED COUNTERPOINT II.** (3) (2 hours)
- 211-648A **THEORY TUTORIAL.** (3)
- 211-649B **THEORY TUTORIAL.** (3)
- 211-652A **SEMINAR IN MUSIC THEORY I.** (3) (3 hours)
- 211-653B **SEMINAR IN MUSIC THEORY II.** (3) (3 hours)
- 211-654A **SEMINAR IN MUSIC THEORY III.** (3) (3 hours)
- 211-655B **SEMINAR IN MUSIC THEORY IV.** (3) (3 hours)
- 211-656A **SEMINAR IN MUSIC THEORY V.** (3) (3 hours)
- 211-657B **SEMINAR IN MUSIC THEORY VI.** (3) (3 hours)
- 211-658A **HISTORY OF MUSIC THEORY I.** (3) (3 hours) Selected topics in the history of music theory from Greek antiquity to 1700 through readings of primary and secondary literature.
- 211-659B **HISTORY OF MUSIC THEORY II.** (3) (3 hours) Selected topics in the history of music theory from 1700 to the present through readings of primary and secondary literature.
- 213-552A **COMPUTER APPLICATIONS IN MUSIC.** (3) (3 hours)
- 213-622D **COMPOSITION TUTORIAL.** (6)
- 213-623A **ELECTRONIC MUSIC SEMINAR I.** (3) (3 hours seminar, 6 hours studio time)
- 213-624B **ELECTRONIC MUSIC SEMINAR II.** (3) (3 hours seminar, 6 hours studio time)
- 213-625D **MUSIC NOTATION SEMINAR.** (6) (3 hours)
- 213-631A **SEMINAR IN 20TH-CENTURY MUSIC I.** (3) (3 hours)
- 213-632B **SEMINAR IN 20TH-CENTURY MUSIC II.** (3) (3 hours)
- 213-633A **SEMINAR IN 20TH-CENTURY MUSIC III.** (3) (3 hours)
- 213-634B **SEMINAR IN 20TH-CENTURY MUSIC IV.** (3) (3 hours)
- 213-635A **SEMINAR IN 20TH-CENTURY MUSIC V.** (3) (3 hours)
- 213-636B **SEMINAR IN 20TH-CENTURY MUSIC VI.** (3) (3 hours)
- 213-722D **DOCTORAL COMPOSITION TUTORIAL.**
- 214-653B **MUSIC AESTHETICS AND CRITICISM.** (3) (3 hours)
- 214-678A **MUSICOLOGY TUTORIAL.** (3)
- 214-679B **MUSICOLOGY TUTORIAL.** (3)

- 214-680A **SEMINAR IN MUSICOLOGY I.** (3) (3 hours)
- 214-681B **SEMINAR IN MUSICOLOGY II.** (3) (3 hours)
- 214-682A **SEMINAR IN MUSICOLOGY III.** (3) (3 hours)
- 214-683B **SEMINAR IN MUSICOLOGY IV.** (3) (3 hours)
- 214-684A **SEMINAR IN MUSICOLOGY V.** (3) (3 hours)
- 214-685B **SEMINAR IN MUSICOLOGY VI.** (3) (3 hours)
- 214-692A **SEMINAR IN MUSIC LITERATURE I.** (3) (3 hours)
- 214-693B **SEMINAR IN MUSIC LITERATURE II.** (3) (3 hours)
- 214-694A **SEMINAR IN MUSIC LITERATURE III.** (3) (3 hours)
- 214-695B **SEMINAR IN MUSIC LITERATURE IV.** (3) (3 hours)
- 214-696A **SEMINAR IN MUSIC LITERATURE V.** (3) (3 hours)
- 214-697B **SEMINAR IN MUSIC LITERATURE VI.** (3) (3 hours)
- 215-690A **PERFORMANCE PRACTICE SEMINAR I.** (3) (3 hours)
- 215-691B **PERFORMANCE PRACTICE SEMINAR II.** (3) (3 hours)
- 215-692A **PERFORMANCE PRACTICE SEMINAR III.** (3) (3 hours)
- 215-693B **PERFORMANCE PRACTICE SEMINAR IV.** (3) (3 hours)
- 215-694A **PERFORMANCE PRACTICE SEMINAR V.** (3) (3 hours)
- 215-695B **PERFORMANCE PRACTICE SEMINAR VI.** (3) (3 hours)
- 216-605A OR B **DIGIT (SOUND) SYNTH & AUDIO PROCESS.** (3) (3 hours) Basic principles of digital sound synthesis including techniques such as additive synthesis, frequency modulation, tuned resonators, waveshaping and digital audio processing techniques including simple delay systems, filters, reverberators, spatial controllers, etc. will be explored.
- 216-609A OR B **MUSIC, MEDIA & TECHNOLOGY PROJECT.** (3) (3 research/project hours) Independent music technology project. Students will prepare a statement of objectives, a comprehensive project design and a schedule of work, and will undertake the project on appropriate music technology platforms.
- 216-610A **COMPUTER MUSIC SEMINAR I.** (3) (3 hours) Advanced topics in computer applications in music will be examined. Students will be expected to 1) present critical analyses of current research and 2) develop and implement software demonstrations.
- 216-611B **COMPUTER MUSIC SEMINAR II.** (3) (3 hours)
- 216-612A **COMPUTER MUSIC SEMINAR III.** (3) (3 hours)
- 216-613B **COMPUTER MUSIC SEMINAR IV.** (3) (3 hours)
- 216-614A **COMPUTER MUSIC SEMINAR V.** (3) (3 hours)
- 216-615B **COMPUTER MUSIC SEMINAR VI.** (3) (3 hours)
- 216-629D **TECHNICAL EAR TRAINING.** (4) (1 hour tutorial, 2 hours laboratory) This course will, through a sequence of specific auditory exercises, develop and improve students' aural sensitivity to small changes in sound quality. Students train to identify spectral variables in sound, develop stable reference of sound quality and learn about spectral characteristics of musical instruments.
- 216-631D **ADVANCED TECHNICAL EAR TRAINING.** (4) (1 hour tutorial, 2 hours laboratory) (Prerequisite: 216-629D) Included in this course are exercises for developing some of the following aural skills: identification and quantification of spatial parameters of sound image, nonlinear and transient distortion audibility, identification of coherent and incoherent noise, sound source identification in complex textures, sound enhancement and reconstruction.
- 216-667A OR B **DIGITAL STUDIO TECHNOLOGY.** (3) (3 hours lecture) Technical and operational characteristics of different digital recording systems currently employed by the recording industry.
- 216-668A OR B **DIGITAL/ANALOG AUDIO EDITING.** (3) (1 hour tutorial, 3 hours studio time) Using analog and digital record/playback equipment, students learn, through practice, the art of replacing, patching, rebalancing, reconstructing, or generally speaking, improving recorded music through editing. Teaching will include cut and splice editing, disk-based editing, and editing by transfer and mixing.
- 216-669A,B,D **TOPICS – CLASSICAL MUSIC RECORDING.** (3) (3 hours lecture) Issues involving classical music recording. Topics may include: analysis of performance styles, acoustics of concert

halls, production of music videos, seminars with recording producers, tonmeisters, classical music in multimedia, and others.

216-670D RECORDING THEORY & PRACTICE I. (10) (3 hours seminar, 6 hours studio time) (Prerequisite: 216-300D) Theoretical and practice study of recording equipment, procedures and techniques. Recording sessions and live stereo recording, using the recording studio, concert hall and portable equipment for on-location recording. Also included will be an introduction to the areas of radio drama, broadcast recording and radio commercials.

216-671D RECORDING THEORY & PRACTICE II. (10) (3 hours seminar, 6 hours studio time) (Prerequisite: 216-670D) Emphasis on multi-track recording theory and practice. The course will also concentrate on expanded multi-track procedures: signal processing, overdubbing, mixing, editing, and producing.

216-672D ANALYSIS OF RECORDINGS. (6) (3 hours) The analysis of recording engineering, production, performance, aesthetics and technical quality of selected recordings.

216-674A OR B ELECTRONIC & ELECTROACOUSTIC MEAS. (3) (1½ hours lecture, 1½ hours laboratory) This course demonstrates the instruments, measurement procedures, and techniques used in a recording studio to determine the acoustical properties of a room and the transfer functions of devices used in a studio. Theoretical lectures on electronic test instrumentation and measurement methods are combined with practical application.

216-676A,B,D AUDIO INDUSTRY EXPERIENCE. (3)

216-677D AUDIO FOR VIDEO POST-PRODUCTION. (6) (3 hours seminar, 4 hours studio time) Theoretical study includes historical analysis of sound for image, audio post-production process for film and video, aesthetic and technical considerations in sound design, time code and synchronization, and final mix formats. Practical skills include field recording, sound library management, sound design, dialog, effects and music editing, and final mix process.

216-678B ADV. DIGITAL EDIT. & POST-PRODUCT. (3) (3 hours) (Prerequisite: 216-668) This course covers advanced concepts and techniques of audio post-production using digital workstations. Students practise the assembly of raw material into a complete final product through editing, signal processing, mixing, sound restoration and pre-mastering.

216-690A MEDIA THEORY & PRACTICE SEMINAR I. (3) (3 hours) Topics vary from year to year and are normally chosen according to the individual instructor's area of expertise. Topics to be covered may include the following: Media Technology, Digital Restoration of Archival Recordings, Communications Systems and Standards, Audio Aesthetics of Video Musicals, Classical Music and the Television Medium, etc.

216-691B MEDIA THEORY & PRACTICE SEMINAR II. (3) (3 hours)

216-692A MEDIA THEORY & PRACTICE SEMINAR III. (3) (3 hours)

216-693B MEDIA THEORY & PRACTICE SEMINAR IV. (3) (3 hours)

216-694A MEDIA THEORY & PRACTICE SEMINAR V. (3) (3 hours)

216-695B MEDIA THEORY & PRACTICE SEMINAR VI. (3) (3 hours)

219-614A OR B READING COURSE I. (3) Independent study of an approved topic or topics under the guidance of a supervisor. Topics will be chosen to suit individual needs and interests. The extent of reading, synthesis, and reporting will be agreed upon by the supervisor and the student at the beginning of the course.

219-615A OR B READING COURSE II. (3)

219-635A,B,D RESEARCH PAPER I. (9)

219-636A,B,D, RESEARCH PAPER II. (9)

219-675A,B,D SPECIAL PROJECT. (3)

219-676A,B,D SPECIAL PROJECT. (6)

219-694A,B SPECIAL TOPIC SEMINAR. (3) (3 hours)

219-695A,B SPECIAL TOPIC SEMINAR. (3) (3 hours)

219-701D DOCTORAL ORAL COMP. EXAM.

219-702D DOCTORAL WRITTEN COMP. EXAM.

219-705D COLLOQUIUM.

219-749A DOCTORAL TUTORIAL.

219-750B DOCTORAL TUTORIAL.

221-602A SEMINAR IN CHORAL TECHNIQUES. (3) (3 hours)

221-603B SEMINAR IN CHORAL TECHNIQUES. (3) (3 hours)

222-610A SEMINAR IN MUSIC EDUCATION I. (3) (3 hours)

222-611B SEMINAR IN MUSIC EDUCATION II. (3) (3 hours)

222-612A SEMINAR IN MUSIC EDUCATION III. (3) (3 hours)

222-613B SEMINAR IN MUSIC EDUCATION IV. (3) (3 hours)

222-618A MUSIC EDUCATION TUTORIAL I. (3)

222-619B MUSIC EDUCATION TUTORIAL II. (3)

● **223-606A SEMINAR IN ORCHESTRA/BAND TECH.** (3) (3 hours)

● **223-607B SEMINAR IN ORCHESTRA/BAND TECH.** (3) (3 hours)

240-601A OR B JAZZ PEDAGOGY. (3) (3 hours) A course designed to prepare students to teach jazz-related subjects at the university and professional level, with emphasis on ensemble direction and the instruction of improvisation, as well as course and curriculum development. Various pedagogical methods, philosophies, rehearsal techniques, and materials will be investigated.

240-640D JAZZ COMPOSITION & ARRANGING. (4) (2 hours) A course intended to guide the student towards an individual musical style. A variety of jazz compositional and arranging techniques will be explored.

242-603A,B BRASS INSTRUMENT PERF. & REPERTOIRE. (3)

(3 hours) Designed for the brass performer/prospective teacher. Emphasis on a wide variety of brass literature and performance practice: solos, pedagogical materials, and chamber music for various levels of performance.

242-611A DIRECTED TEACHING I. (2) (1 hour)

242-612B DIRECTED TEACHING II. (2) (1 hour)

242-613A DIRECTED TEACHING III. (2) (1 hour)

242-614B DIRECTED TEACHING IV. (2) (1 hour)

242-615A,B MASTER CLASS – ORCHESTRAL CONDUCTING. (3)

(3 hours) Advanced stick techniques, score preparation, stylistic concerns and rehearsal techniques will be discussed with reference to selected major works from the 18th, 19th, and 20th century orchestral repertoire. Emphasis will be placed on practical considerations.

242-616A,B MASTER CLASS – CHORAL CONDUCTING. (3) (3 hours)

To focus on the problems of advanced choral repertoire, e.g., conducting techniques, score analysis, choral sound and textual criticism. Repertoire will include representative works from Medieval music to the present day.

242-620A PERFORMANCE TUTORIAL I. (4)

Staff

242-621B PERFORMANCE TUTORIAL II. (4)

Staff

242-622A PERFORMANCE TUTORIAL III. (4)

Staff

242-623B PERFORMANCE TUTORIAL IV. (4)

Staff

242-624A PERFORMANCE TUTORIAL V. (4)

Staff

242-630A PERFORMANCE TUTORIAL VI. (6)

Staff

242-631B PERFORMANCE TUTORIAL VII. (6)

Staff

242-632A PERFORMANCE TUTORIAL VIII. (6)

Staff

242-633B PERFORMANCE TUTORIAL IX. (6)

Staff

242-650D PEDAGOGY WORKSHOP. (6) (1½ hours) Teaching of one or more students chosen in consultation with the respective area, and a presentation on an approved topic of the candidate's choice.

242-658A,B,C,D OPERA PERFORMANCE EXAMINATION. (6) The student performs a major role in a public performance of a full-length opera. To be marked on a pass-fail basis.

242-659D PERFORMANCE IN RECORDING MEDIA. (12) The candidate must submit a 60-75 minute audio and/or video document of his or her performances, compiled from various media sources. This might include radio, television, and/or studio recordings. All of the music must be composed and arranged by the candidate.

242-660D SOLO RECITAL I. (12)

242-661D CHAMBER MUSIC RECITAL I. (12)

242-662D SOLO AND CHAMBER MUSIC RECITAL. (12)

242-663A,B,C,D QUICK STUDY. (6) (To be successfully completed before the first recital is performed.)

242-664A,B,C,D REPERTOIRE EXAMINATION. (6)

242-665D ACCOMPANYING RECITAL I. (12)

242-667D SOLO RECITAL II. (12)

242-668D CHAMBER MUSIC RECITAL II. (12)

● **242-669D ACCOMPANYING RECITAL II.** (12)

242-672D LITURGICAL IMPROVISATION. (3) (1½ hours) The study and practice of cantus firmus-based improvisation according to selected stylistic models so as to provide diversity of techniques, styles and tonalities. Free improvisation is studied in conjunction with C.F. improvisation. Modulation is taught in both C.F.-based and free improvisation; emphasis being placed on clarity and liturgical appropriateness.

242-673A,B 20TH-CENTURY ORGAN IMPROVISATION. (3) (3 hours seminar) The relationship between creative improvisation and composition will be examined. Students will develop their knowledge of timbre and dynamics as structural elements. Three different organs will be used to familiarize the students with different aspects of improvisation in different situations.

242-674A,B SEMINAR IN ORGAN REGISTRATION. (3) (3 hours) Organ registration from the late Gothic through the symphonic tradition of the 19th century will be discussed. Special attention will be given to the national building styles of German, French, Italian and Iberian organs and their evolution from the Renaissance to the 20th century.

242-675A,B,D, SPECIAL PROJECT IN PERFORMANCE I. (3)

242-676D SPECIAL PROJECT IN PERFORMANCE II. (6)

242-677A SEMINAR IN PERFORMANCE TOPICS I. (3) (3 hours)

242-678B SEMINAR IN PERFORMANCE TOPICS II. (3) (3 hours)

242-683A,B THE PIANIST AS PARTNER. (3) (3 hours) Studies in the role of the pianist in partnership with an instrumentalist or singer, with emphasis given to preparation of works for performance. These studies will include a survey of repertoire, comparison of styles, and a basic knowledge of other instruments. Performance of work(s) studied is a requirement for the course.

242-685A,B MASTER CLASS – 20TH-CENTURY PIANO MUSIC. (3) (3 hours) Students will explore the piano repertoire of the 20th century. Repertoire will include such diverse music as that of Milhaud, Ives, Boulez, Berio, etc., as well as the recent Canadian music of Tremblay, Mather, etc. Performance of work(s) studied is a requirement for the course.

242-686A,B MASTER CLASS – STRING CHAMBER MUSIC. (3) (3 hours) Advanced studies of the chamber music repertoire, intended for graduate string players. Students will gain firsthand experience playing, reading (in rotation) and studying works both with their colleagues and occasionally with the instructor; discussion of master recordings and active listening with scores.

242-687A,B DEVELOPMENT – WOODWIND INSTRUMENTS. (3) (3 hours) This course traces the technical, mechanical, and tonal development of woodwinds from antiquity to modern times, and will include performance and discussion of alternate fingerings, addition of ringed keys, different bore designs, Bartolozzi techniques, etc., as well as changes in orchestral function and style.

242-696A,B TECHNICAL LITERATURE FOR PIANO. (3) (3 hours) Studies of published works on piano performance technique and interpretation. Students will read and discuss selected texts as well as make individual reports on particular studies on technical schools or methods.

242-698A,B 20TH-CENTURY WIND REPERTOIRE. (3) (3 hours) A study of performance problems related to small mixed wind ensembles and wind band repertoire of the late 20th century. Special emphasis will be given to score reading, performance and notational problems, interpretation, and efficient rehearsal procedures.

242-699D CHURCH SERVICE PLAYING. (4) (2 hours) The course is designed to assist organists in developing the skills necessary to

accompany church services. All aspects of liturgical music will be dealt with including hymns, Psalms (both Gregorian and Anglican chant), Mass settings, anthem accompaniment, and adaptation of orchestral scores to the organ.

243-660A,B CHAMBER MUSIC ENSEMBLE. (1) **Staff**

243-661A,B EARLY MUSIC CHAMBER MUSIC ENSEMBLE. (1) (Prerequisite: Audition; 1 hour) Chamber music of the Medieval, Renaissance and Baroque periods.

● **243-671A,B MEDIEVAL & RENAISSANCE MUSIC WORKSHOP.** (2) (4 hours) (Prerequisite: Audition)

243-672A,B CAPPELLA ANTICA. (2) (4 hours) (Prerequisite: Audition) An ensemble of 8 to 12 voices specializing in early music.

Professor Baboukis

243-673A,B COLLEGIUM MUSICUM. (2) (4 hours) (Prerequisites: Audition AND 243-480A & B AND 215-381; Additional prerequisite for keyboard players: 242-372D with a grade of A-) Open to singers and instrumentalists, this ensemble specializes in chamber music primarily of the Baroque era. **Professor Knox and Staff**

● **243-678A,B CHAMBER WINDS.** (2) (4 hours) (Prerequisite: Audition. Corequisite for wind players: 243-697A,B)

243-679A,B SONG INTERPRETATION. (1) (Prerequisite: Audition; 2 hours) Study of the standard song repertoire with emphasis on the singer and pianist as partners. The student will be assigned to work with two singers. A public recital will be given at the end of each term.

243-680A,B EARLY MUSIC ENSEMBLE. (1) (2 hours) (Prerequisite: Audition. Prerequisite or corequisite for keyboard players: 242-272D) An ensemble of 4-6 vocalists and instrumentalists which performs music of the Medieval, Renaissance and Baroque periods. **Professor Knox and Staff**

243-684A,B STUDIO ACCOMPANYING. (2) (Prerequisite: Audition; 2 hours) Students will be assigned to work as accompanists with performance teachers and their students.

243-690A,B MCGILL WINDS. (2) (4 - 6 hours) (Prerequisite: Audition) **Staff**

243-693A,B CHORAL ENSEMBLE. (2) (4 hours) (Prerequisite: Audition) Students enrolling in Choral Ensembles will be assigned to one of the following groups. **Professors Baboukis and Edwards**

Chamber Singers: a group of approximately 24 mixed voices which explores the capella repertoire of all periods as well as works with chamber accompaniment. Section 01

Concert Choir: an ensemble of approximately 60 voices (S.A.T.B.) which performs the repertoire from all periods appropriate to a group of this size. Section 02

University Chorus: a mixed chorus of approximately 100 which performs a variety of choral material including both traditional and popular selections. Section 03

Women's Chorale: an ensemble of approximately 40 women stressing the fundamentals of singing and ensemble participation. Works are chosen from the substantial repertoire available for women's voices. Section 04

243-694A,B CONTEMPORARY MUSIC ENSEMBLE. (2) (4 hours) (Prerequisite: Audition) An ensemble of approximately 15 performers which will explore 20th-century ensemble repertoire.

Professor Bouliane

243-695A,B JAZZ ENSEMBLE. (2) (3-4 hours) (Prerequisite: Audition) **Professor Foote and Staff**

243-696A,B OPERA THEATRE. (2) (3-6 hours) (Prerequisite: open to all Graduate Performance and Artist Diploma students who have completed 243-496 or its equivalent.) Individual coaching in acting, movement and role preparation; possibility for roles in Opera McGill productions (by audition).

Professors Ross-Neill, Vernon and Staff

243-697A,B ORCHESTRA. (2) (6-7 hours) (Prerequisite: Audition. Corequisite for wind players: 243-678A,B) A full orchestra of

approximately 90 which performs the symphonic repertoire. N.B. Woodwind and brass players will take one hour per week of Repertoire Class as a part of Orchestra. **Professor Vernon and Staff**

253-600A VOCAL REPERTOIRE COACHING I. (2) (1 hour) A course in which the performer will have individual coaching sessions on repertoire, with emphasis on musical and linguistic nuance.

253-601B VOCAL REPERTOIRE COACHING II. (2) (1 hour)

253-690A OR B VOCAL STYLES & CONVENTIONS. (3) (3 hours) Emphasis on vocal performance practices through practical application: text, language, inflection, pronunciation and interpretation considered with individuality of each student's voice and technical development. After examining historical treatises, students will discuss and present musical selections utilizing modern performance standards yet remaining true to stylistic demands of each period.

253-691A VOCAL SEMINAR I. (3) (3 hours) (Open to singers, pianists, and conductors with permission of instructor.)

253-692B VOCAL SEMINAR II. (3) (3 hours) (Open to singers, pianists, and conductors with permission of instructor.)

● **253-693A VOCAL TREATISES & METHODS.** (3) (3 hours)

● **253-694B VOCAL PHYSIOLOGY FOR SINGERS.** (3) (3 hours)

Advanced Undergraduate Courses

Students deficient in their background preparation may be required to take some of the following undergraduate courses in addition to their required graduate courses.

For an up-to-date listing of upper-level music history courses that will be offered, please consult the final 2000-01 Faculty of Music timetable.

With the exception of 211-501, 211-502 and 211-503, all 500-level courses are available as elective courses to graduate students.

211-301A Modal Counterpoint I
211-302B Modal Counterpoint II
211-303A Tonal Counterpoint I
211-304B Tonal Counterpoint II
211-327D 19th-Century Analysis
211-427D 20th-Century Analysis
211-501 Theory Review I
211-502 Theory Review II
211-503 Theory Review III
211-522D Advanced Counterpoint
211-523D Advanced Harmony
211-528 Schenkerian Techniques
211-529 Proseminar in Music Theory
211-538 Mathematical Models for Musical Analysis
214-366 Era of the Fortepiano
214-372 Solo Song Outside Germany & Austria
214-377 Baroque Opera
214-379 Solo Song 1100-1700
214-380 Medieval Music
214-381 Renaissance Music
214-382 Baroque Music
214-383 Classical Music
214-384 Romantic Music
214-385 Early Twentieth-Century Music
214-386 Chamber Music Literature
214-387 Opera from Mozart to Puccini
214-388 Twentieth-Century Opera
214-389 Orchestral Literature
214-390 The German Lied
214-391 Canadian Music
214-392 Music Since 1945
214-395 Keyboard Literature before 1750
214-396 Era of the Modern Piano
214-397 Choral Literature after 1750
214-398 Wind Ensemble Literature after 1750
214-489 History of Music Theory
214-570 Research Methods in Music
214-591D Paleography

215-381 Topics in Perf. Practice before 1800
215-385 Topics in Perf. Practice after 1800
216-306 Music & Audio Computing I
216-307 Music & Audio Computing II
221-315A Choral Conducting I
221-415B Choral Conducting II
222-402D Principles and Processes of Music Ed.
222-403A,B Selected Topics in Music Ed.
222-404A,B Selected Topics in Music Ed.
223-315A Instrumental Conducting I
223-415A Instrumental Conducting II
242-372D Continuo
243-494A,B Contemporary Music Ensemble

53 Natural Resource Sciences

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Chair — W. Hendershot

Graduate Program Director — R.D. Titman

53.1 Staff

Emeritus Professors

A.C. Blackwood; B.Sc., M.Sc.(Alta.), Ph.D.(Wis.), F.R.S.C.; Microbiology
R. Knowles; B.Sc.(Birm.), Ph.D., D.Sc.(Lond.); Microbiology
A.F. MacKenzie; B.S.A., M.Sc.(Sask.), Ph.D.(C'nell); Soil Science
R.A. MacLeod; B.A., M.A.(Br.Col.), Ph.D.(Wis.), F.R.S.C.; Microbiology
P.H. Schuepp; Dipl.Sc.Nat.(Zür.), Ph.D.(Tor.); Agricultural Physics
R.K. Stewart; B.Sc.(Agr.), Ph.D.(Glas.); Entomology

Professors

N.N. Barthakur; B.Sc.(Gauh.), M.Sc.(Alld.), Ph.D.(Sask.); Agricultural Physics
D.M. Bird; B.Sc.(Guelph), M.Sc., Ph.D.(McG.); Wildlife Biology
W.H. Hendershot; B.Sc.(Tor.), M.Sc.(McG.), Ph.D.(Br.Col.); Soil Science
E.S. Idziak; B.Sc.(Agr.), M.Sc.(McG.), D.Sc.(Delft); Microbiology

Associate Professors

B. Côté; B.Sc., Ph.D.(Laval); Forest Resources
M.A. Curtis; B.Sc., M.Sc., Ph.D.(McG.); Wildlife Biology
G.B. Dunphy; B.Sc.(U.N.B.), M.Sc., Ph.D.(Mem.); Entomology
J.W. Fyles; B.Sc., M.Sc.(Vic., B.C.), Ph.D.(Alta.); Forest Resources
D.J. Lewis; B.Sc., M.Sc., Ph.D.(Mem.); Entomology
G.R. Mehuys; B.Sc., Ing.Agron.(Gembloux), Ph.D.(Calif.); Soil Science
D.F. Niven; B.Sc., Ph.D.(Aber.); Microbiology
M.E. Rau; B.Sc.(Purdue), M.Sc., Ph.D.(McG.); Entomology
R.D. Titman; B.Sc.(McG.), M.Sc.(Bishop's), Ph.D.(U.N.B.); Wildlife Biology

Assistant Professors

D. Berteaux; Bqcc.(Lycée M. Genevoix), Dip.(Nantes), M.Sc.(Rennes), Ph.D.(Sherbrooke); Wildlife Biology
B.T. Driscoll; B.Sc., Ph.D.(McM.); Microbiology
C. Hamel; B.Sc., Ph.D.(McG.); Soil Science
J. Whalen; B.Sc.(Agr.)(Dal.), M.Sc.(McG.), Ph.D.(Ohio St.); Soil Science
T.A. Wheeler; B.Sc.(Mem.), M.Sc., Ph.D.(Guelph); Entomology

Adjunct Professors

R. Anderson, F. Archibald, G. Boiteau, G. Boivin, T. Charles, H. Chiasson, J. Cumming, C. Greer, T. Herman, H. Murkin, M. St-Arnaud, J.P. Savard, A. Scheuhammer, D. Sergeant, N. Seymour, R. Simard, T.G. Smith, I. Thompson, C. Vincent, F.G. Whoriskey

Associate Members

L. Chan (*Dietetics and Human Nutrition*), W.D. Marshall (*Food Science and Agricultural Chemistry*), G.J. Matlashewski (*Parasitology*), D. Smith (*Plant Science*)

Cross-Appointed Professor

P. Brown (*Geography and McGill School of Environment*)

53.2 Programs Offered

The Department of Natural Resource Sciences offers programs leading to M.Sc. and Ph.D. degrees in Entomology, Microbiology, and Renewable Resources (includes Agrometeorology, Forest Science, Soil Science and Wildlife Biology).

The Department possesses, or has access to, excellent facilities for laboratory research and research in the field. Affiliated with the Department are the Lyman Entomological Museum and Research Laboratory, the Morgan Arboretum, the Avian Science and Conservation Centre, and the Ecomuseum of the St. Lawrence Valley Natural History Society.

53.3 Admission Requirements

General

Competency in English – Non-Canadian applicants whose mother tongue is not English and who have not completed an undergraduate degree using the English language, are required to submit documented proof of competency in oral and written English by appropriate exams, e.g. TOEFL (Test of English as a Foreign Language) with a minimum score of 550 or equivalent in other tests before registration.

The Graduate Record Exam is not required, however, it is highly recommended.

M.Sc.

Candidates are required to have a Bachelor's degree with an equivalent cumulative grade point average of 3.0/4.0 and a sufficient background in the appropriate basic sciences.

Ph.D.

Candidates, normally, are required to hold an M.Sc. Degree and will be judged primarily on their ability to conduct an original and independent research study.

53.4 Application Procedures

Applications for Admission and all supporting documents must be sent directly to:

Student Affairs Office (Graduate Studies)
Macdonald Campus of McGill University
21,111 Lakeshore
Sainte-Anne-de-Bellevue, QC H9X 3V9
Canada

Telephone: (514) 398-7925

Fax: (514) 398-7968

E-mail: GRAD@macdonald.mcgill.ca

Applications will be considered upon receipt of a signed and completed application form, \$60 application fee, all official transcripts, two signed original letters of reference on official letterhead of originating institution, and (if required) proof of competency in oral and written English by appropriate exams.

Deadlines – For **international students**, complete applications with supporting documents must reach the Student Affairs Office (Graduate Studies) at Macdonald Campus at least **eight months** prior to the intended start of program. May 1 for January (winter); September 1 for May (summer); January 1 for September (fall).

For **domestic students**, complete applications with supporting documents must reach the office no later than **three months** in advance of intended start of program.

Application Fee (non-refundable) – A fee of \$60 Canadian must accompany each application (including McGill students), *otherwise it cannot be considered*. This sum must be remitted using one of the following methods:

1. **Certified** personal cheque in Cdn.\$ drawn on a Canadian bank;
2. **Certified** personal cheque in U.S.\$ drawn on a U.S. bank;
3. Canadian Money order in Cdn.\$;
4. U.S. Money Order in U.S.\$;
5. Bank draft in Cdn.\$ drawn on a Canadian bank;
6. Bank draft in U.S.\$ drawn on a U.S. bank, negotiable in Canada;
7. Credit card (by completing the appropriate section of the application form).

Transcripts – Two official copies of all transcripts are required for admission. Transcripts written in a language other than English or French must be accompanied by a certified translation. An explanation of the grading system used by the applicant's university is essential. It is the applicant's responsibility to arrange for transcripts to be sent. **DOCUMENTS SUBMITTED WILL NOT BE RETURNED.**

It is desirable to submit a list of the titles of courses taken in the major subject, since transcripts often give code numbers only. Applicants must be graduates of a university of recognized reputation and hold a Bachelor's degree equivalent to a McGill Honours degree in a subject closely related to the one selected for graduate work. This implies that about one-third of all undergraduate courses should have been devoted to the subject itself and another third to cognate subjects.

The minimum cumulative grade point average (CGPA) is 3.0/4.0 (second-class upper) or 3.2/4.0 during the last two full-time years of university study. High grades are expected in courses considered by the academic unit to be preparatory to the graduate program.

Letters of Recommendation – Two letters of recommendation on letterhead or bearing the university seal and with original signatures from two instructors familiar with the applicant's work, preferably in the applicant's area of specialization, are required. It is the applicant's responsibility to arrange for these letters to be sent.

Competency in English – Non-Canadian applicants whose mother tongue is not English and who have not completed an undergraduate degree using the English language are required to submit documented proof of competency in oral and written English, by appropriate exams, e.g. TOEFL (minimum score 550) or IELTS (minimum 6.5). The MCHS is not considered equivalent. Results must be submitted as part of the application. The University code is 0935 (McGill University, Montreal); department code is 31 (graduate schools), Biological Sciences - Agriculture.

Graduate Record Exam (GRE) – The GRE is not required, but it is highly recommended.

Financial aid is very limited and highly competitive. It is suggested that students give serious consideration to their financial planning before submitting an application.

Acceptance to all programs depends on a staff member agreeing to serve as the student's supervisor and the student obtaining financial support. Normally, a student will not be accepted unless adequate financial support can be provided by the student and/or the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships or other funds.

Qualifying Students – Some applicants whose academic degrees and standing entitle them to serious consideration for admission to graduate studies, but who are considered inadequately prepared in the subject selected may be admitted to a *Qualifying Program* if they have met the Faculty of Graduate Studies and Research minimum CGPA of 3.0/4.0. The course(s) to be taken in a *Qualifying Program* will be prescribed by the academic unit concerned. *Qualifying students* are registered in the Faculty of

Graduate Studies and Research, **but not as candidates for a degree.** Only one qualifying year is permitted. **Successful completion of a qualifying program does not guarantee admission to a degree program.**

53.5 Program Requirements

M.Sc.

Candidates must complete a course and research program of a minimum of 45 credits elaborated in consultation with their Supervisory Committee. Course work (6 credits minimum) will include at least two, normally graduate-level, courses and in most research areas, at least one of these courses must be a graduate-level course in statistics. Students are required to register for three 1-credit seminar courses, the last of which will consist of a formal presentation of the student's final thesis research. Candidates must also register in the three M.Sc. Thesis Research courses (373-691, -692, -693; 36 credits) and present a satisfactory thesis based on their research.

Ph.D.

Course requirements are specified by the staff in the discipline but are flexible and depend largely on the student's background, immediate interests, and ultimate objectives. Students are required to register for four 1-semester seminar courses.

Also required are satisfactory performance in the Ph.D. Comprehensive Examination (373-701) and the presentation, and subsequent defence, of a satisfactory thesis based on the student's research.

53.6 Courses for Higher Degrees

● Denotes not offered in 2000-01.

★ Denotes courses offered in alternate years.

The course credit weight is given in parentheses (#) after the course title.

● ★338-510B AGRICULTURAL MICROMETEOROLOGY. (3) (3 lectures)

338-602B ISOTOPIC TRACER TECHNIQUES. (3) (3 lectures and 1 four-hour lab) (Prerequisite: 338-303A or equivalent.) An advanced practical course to introduce students to laboratory equipment and techniques required for tracer experiments. Theory and use of end-window and windowless G.M. counter, proportional counters, scintillation counters both solid and liquid types.

Professor Barthakur

★350-525B INSECT ECOLOGY. (3) Professor Lewis

● ★350-535B AQUATIC ENTOMOLOGY. (3)

350-600A,B INSECT PATHOLOGY. (3) Professor Dunphy

350-610D ADVANCED TAXONOMY AND ZOOGEOGRAPHY. (6) Professor Wheeler

● 350-726B INSECT POPULATION DYNAMICS. (3)

● ★360-612B MATHEMATICAL METHODS. (3) (3 lectures) (Prerequisite: 360-205B or equivalent.)

362-740D INVITATION LECTURES IN MICROBIOLOGY I. (1) (1 seminar) Prominent scientists, actively engaged in research will be invited to present a series of lectures in the field of their research interest. The speakers and their topics will be chosen to complement the offerings of the permanent staff.

362-741D INVITATION LECTURES IN MICROBIOLOGY II. (1) (1 seminar) Description as for course 362-740D.

362-742D INVITATION LECTURES IN MICROBIOLOGY III. (1) (1 seminar) Description as for course 362-740D.

362-764A READING AND CONFERENCE. (3) (2 hours) Student presentations, taken from current literature, concerned with various aspects of a central topic chosen for the term. Such presentations are designed to be informal and to generate discussions. Topic will change from term to term. Staff

362-765B READING AND CONFERENCE. (3) (2 hours) Description as for 362-764A. Staff

★372-610D PEDOLOGY. (3) (2 lectures per week, one term) Processes of profile development, principles of classification, comparative taxonomy, U.S. and Canadian systems.

Professor Hendershot

● ★372-630D SOIL MINERALOGY. (3) (2 lectures per week, one term)

372-631B ADVANCED SOIL PHYSICS. (3) (2 lectures per week, one term) State and fluxes of matter and energy in the soil. Applications to movement of water, salts, nutrients; diffusion of gases; heat transfer. Discussion of significant research in soil physics.

Professor Mehuys

● ★373-515B PARASITOID BEHAVIOURAL ECOLOGY. (3) (3 lectures and one 2-hour seminar) (Prerequisite: 373-330A or equivalent)

373-520B INSECT PHYSIOLOGY. (3) (Prerequisite: Permission of instructor.) Organismal approach to insects, emphasizing the physiology and development, and the physiological relations of insects to their environment. Professor Dunphy

● ★373-521B SOIL MICROBIOLOGY AND BIOCHEMISTRY. (3) (Prerequisite: 372-210A)

373-550B VETERINARY AND MEDICAL ENTOMOLOGY. (3) (Prerequisite: Permission of instructor.) Environmental aspects of veterinary and medical entomology. An advanced course dealing with the biology and ecology of insects and acarines as aetiological agents and vectors of disease, and their control. Integrated approaches to problem solving. Professor Rau

373-643A,B GRADUATE SEMINAR I. (1) Open to students in the M.Sc. Program. Presentation on a selected topic, research proposal, or research results based on progress towards the M.Sc. degree.

Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students

Section 03 Microbiology students

373-644A,B GRADUATE SEMINAR II. (1) Open to students in the M.Sc. Program. Presentation on a selected topic, research proposal, or research results based on progress towards the M.Sc. degree.

Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students

Section 03 Microbiology students

373-651A,B GRADUATE SEMINAR III. (1) Open to students in the M.Sc. Program. Presentation of an M.Sc. student's final thesis results.

Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students

Section 03 Microbiology students

373-680A,B,C SPECIAL TOPICS I. (1) Students pursue topics not otherwise available in formal courses, under staff supervision.

373-681A,B,C SPECIAL TOPICS II. (1) Students pursue topics not otherwise available in formal courses, under staff supervision.

373-682A,B,C SPECIAL TOPICS III. (2) Students pursue topics not otherwise available in formal courses, under staff supervision.

373-683A,B,C SPECIAL TOPICS IV. (2) Students pursue topics not otherwise available in formal courses, under staff supervision.

373-684A,B,C SPECIAL TOPICS V. (3) Students pursue topics not otherwise available in formal courses, under staff supervision.

373-685A,B,C SPECIAL TOPICS VI. (3) Students pursue topics not otherwise available in formal courses, under staff supervision.

373-691A,B,C M.Sc. THESIS RESEARCH I. (12) Independent research under the direction of a supervisor towards the completion of the M.Sc. degree.

373-692A,B,C M.Sc. THESIS RESEARCH II. (12) Independent research under the direction of a supervisor towards the completion of the M.Sc. degree.

373-693A,B,C M.Sc. THESIS RESEARCH III. (12) Completion of the M.Sc. thesis, its approval by reviewers and acceptance by Graduate Faculty are all required for a pass to be granted.

373-701D,N Ph.D. COMPREHENSIVE EXAMINATION. (See Faculty Regulations.)

373-751A,B GRADUATE SEMINAR IV. (Open to students in the Ph.D. Program.) Presentation on a selected topic, research proposal or research results based on progress in the Ph.D. degree.
Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students
Section 03 Microbiology students

373-752A,B GRADUATE SEMINAR V. (Open to students in the Ph.D. Program.) Presentation on a selected topic, research proposal or research results based on progress in the Ph.D. degree.
Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students
Section 03 Microbiology students

373-753A,B GRADUATE SEMINAR VI. (Open to students in the Ph.D. Program.) Presentation on a selected topic, research proposal or research results based on progress in the Ph.D. degree.
Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students
Section 03 Microbiology students

373-754A,B GRADUATE SEMINAR VII. (Open to students in the Ph.D. Program.) Presentation on a selected topic, research proposal or research results based on progress in the Ph.D. degree.
Section 01 Agrometeorology, Forest Science and Soil Science students

Section 02 Entomology and Wildlife Biology students
Section 03 Microbiology students

373-772A ADVANCED MICROBIAL GENETICS. (3) (Prerequisite: Minimum of two undergraduate courses in genetics or permission of instructor.) Topics in bacterial archaeal, eucaryal, and bacteriophage genetics. **Professor Driscoll and Staff**

373-773B ADVANCED MICROBIAL PHYSIOLOGY. (3) (Prerequisite: Minimum of an undergraduate course in biochemistry and in genetics or permission of instructor.) Topics in microbial physiology and metabolism, ranging from current to classic, from biochemical to genetic aspects. **Professor Driscoll**

374-640A,B RECENT ADVANCES IN TREE ECOPHYSIOLOGY. (3) (3 lectures per week) Discussion of the effects of environmental factors on the physiology of trees. Both anthropogenic and natural factors will be discussed. **Professor Côté**

374-660A,B RECENT ADVANCES IN FOREST ECOLOGY. (3) (2 hours seminar) Review and discussion of current literature in forest ecology. Topics covered will depend on the research interests of students and may include population biology of forest plants, forest succession, forest nutrition and nutrient cycling, computer modelling of forest systems. **Professor Fyles**

375-605B WILDLIFE ECOLOGY. (3) (2 class hours per week) Discussion of current topics in wildlife ecology with special reference to the research interests of staff and students involved. **Professor Titman**

375-610A ADVANCED FISH ECOLOGY. (3) (3 class hours per week) A critical examination of current topics in fish ecology; discussion of migration, reproductive strategies, sex determination mechanisms, competition, communication and predator-prey relationships. **Professor Curtis**

54 Neurology and Neurosurgery

Graduate Program in Neurological Sciences
Division of Neuroscience
Department of Neurology and Neurosurgery
Departments of Ophthalmology and Psychiatry
Montreal Neurological Institute, Room 1220
3801 University Street
Montreal, QC H3A 2B4
Canada

Telephone: (514) 398-1905
Fax: (514) 398-7371
E-mail: Monique@MNI.Lan.McGill.ca

Chair, Department of Neurology and Neurosurgery — J. Antel
Chair, Graduate Program in Neurological Sciences — H. Durham

54.1 Staff

Emeritus Professors

D.W. Baxter, G. Bertrand, P. Gloor, J.P. Robb, L. Wolfe

Professors

A. Aguayo; M.D.(Cordoba Natn.), F.R.C.P.(C)
F. Andermann; B.A.(Paris), B.Sc., (McG.), M.D.(Montr.), F.R.C.P.(C)
J. Antel; M.D., B.Sc.(Man.), F.R.C.P.(C)
D. Arnold; B.Sc., M.D.(C'nell), F.R.C.P.(C)
M. Avoli; M.D.(Rome), Ph.D.(McG.)
A. Beaudet; B.A., M.D., Ph.D.(Mont.)
G. Bray; B.Sc.(Bran.), M.D., B.Sc., (Man.), F.R.C.P.(C)
S. Carbonetto; M.Sc.(Mass.), Ph.D.(N.Carolina)
M. Diksic; B.Sc., Ph.D.(Zagreb)
A. Evans; M.Sc.(Sur.), Ph.D.(Leeds)
W.H. Feindel; O.C., B.A.(Acad.), M.D., C.M.(McG.), M.Sc.(Dal.), D.Sc.(Acad. and McG.), D.Phil.(Oxon.), F.R.C.S.(C), F.A.C.S., F.R.S.C.
S.G. Gauthier; B.A., M.D.(Montr.), F.R.C.P.(C)
J. Gotman; M.Eng.(Dart.), Ph.D.(McG.)
D. Guitton; Dipl. IVK(U. Libre de Brux.), B.Eng., M.Eng., Ph.D.Eng., Ph.D.Physiol.(McG.)
I. Heller;
P.C. Holland; B.A.(Lanc.), Ph.D.(N'cle)
B. Jones; B.A., M.A., Ph.D.(Delaware)
M. Jones-Gotman; B.A.(Calif.), M.A., Ph.D.(McG.)
D. Kaplan; B.A.(Clark), Ph.D.(Harv.)
G. Karpati; M.D.(Dal.), F.R.C.P.(C)
D. Lawrence; B.Sc.(Bishop's), M.Sc., M.D., C.M.(McG.), F.R.C.P.(C)
R. Leblanc; M.Sc.(McG.), M.D.(Ott.), F.R.C.S.(C)
F. Miller; B.Sc.(Sask.), Ph.D.(Calg.)
B. Milner; B.A., Sc.D.(Cantab.), Ph.D.(McG.)
G. Mohr; M.D.(Stras.)
R.A. Murphy; A.B.(Worch.), M.Sc.(Boston), Ph.D.(Rutgers); Director
A. Olivier; M.D.(Montr.), Ph.D.(Laval), F.R.C.S.(C)
H. Pappius;
Y. Patel; M.B., Ch.B.(Otago), Ph.D.(Monash), F.R.A.C.P., F.R.C.P.(C)
M. Petrides; B.Sc., M.Sc.(Lond.), Ph.D.(Cantab.)
J. Rasminsky; B.A.(Tor.), M.D.(Harv.), Ph.D.(Lond.), F.R.C.P.(C)
M. Richardson; B.Sc., M.D., C.M., Ph.D.(McG.), F.R.C.P.(C)
G. Rouleau; M.D.(Ott.), F.R.C.P.(C)
A. Sherwin;
J.D. Stewart; B.Sc.(Lond.), M.B., B.S.(W.I.), F.R.C.P.(C)
J.G. Stratford; M.D., C.M., M.Sc.(McG.), F.R.C.S.(C), F.A.C.S.
G. Tannenbaum; M.Sc., Ph.D.(McG.)
C. Thompson; M.Sc., D.Sc.(N.Z.)
G. Watters; B.A.(Minn.), M.D.(Man.), F.R.C.P.(C)

Associate Professors

A. Alonso; M.S.(Barcelona), Ph.D.(Madrid)
E. Andermann; M.D., C.M., M.Sc., Ph.D.(McG.)