Mathematics Department

Calendar cleanup 1997 — Editorial changes.

In the program descriptions:

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page 281, column 2: Recommendations for majors:

Current:

Students interested in teaching are advised to take MATH 308, 309, 312, 313, 446.

New:

Students interested in teaching are advised to take MATH 308, 309, 312, 313, **414,** 446.

Rationale: This should have been put in when the new course MATH 414 (Mathematics Demonstrations) was approved last spring.

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page 281, column 2:

Current:

Students interested in the physical sciences should take MATH 317 which is important for MATH 300**, 316**.

New:

Students interested in the physical sciences should take MATH 317 which is important for MATH 300.

Rationale: MATH 316 no longer uses material from MATH 317.

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page 282, column 1: Honours mathematics, third and fourth year requirements:

Current:

Fifteen credits from **142** MATH 400–403, 416–429, 440, 443, 449

New:

Fifteen credits from MATH 400–403, **405,** 416–429, 440, 443, 449

Rationale: Typographical error; MATH 405 is a new course. This should have put in when it was approved last year.

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page 282, column 3: Combined honours requirements:

Current:

Twelve credits from MATH 400–403, 416–429, 440, 449

New:

Twelve credits from MATH **323, 345,** 400–403, **405,** 416–429, 440, **443,** 449

Rationale: Oversight from last year, when MATH 323 was redisgned, MATH 345 was introduced, Math 405 was added as a new course, and Math 443 was promoted.

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page 282, column 1: Honours mathematics requirements:

Current:

A 68% overall average is required in these 30 credits to obtain an Bachelor of Science with Honours.

New:

A 68% overall average is required in these 30 credits to obtain **a** Bachelor of Science with Honours.

Rationale: Typographical error.

In the course descriptions:

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page 382, column 3:

Current:

100 (3) Calculus I - Derivatives and antiderivatives of the elementary functions. Applications of the derivative: graphing, max-min problems, and growth-decay problems. Prerequisite(s): At least a "C+" standing in Mathematics 12. [3-0-1]

New:

100 (3) Calculus I - Derivatives and antiderivatives of the elementary functions. Applications of the derivative: graphing, max-min problems, and growth-decay problems. Prerequisite(s): At least a "C+" standing in **Principles of** Mathematics 12. [3-0-1]

Rationale: The Provincial secondary school Mathematics program has split in two parts, of which only one is acceptable here.

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page 382, column 3:

Current:

111 (6) Elementary Calculus - Calculus; topics from algebra, geometry, and trigonometry in the context of calculus. MATH 100 and 111 are equivalent as prerequisites to further courses in Mathematics. Credit will not be given for both MATH 100 and 111. Faculties that require Mathematics 12 for admission to first year will grant three credits only for this course toward a degree. Prerequisite(s): Mathematics 11 or the equivalent. This course is not open to students with recent credit for Mathematics 12. Students with only Mathematics 11 intending to take MATH 140 and 141 should take MATH 012. [3-0-1]

New:

111 (6) Elementary Calculus - Calculus; topics from algebra, geometry, and trigonometry in the context of calculus. MATH 100 and 111 are equivalent as prerequisites to further courses in Mathematics. Credit will not be given for both MATH 100 and 111. Faculties that require **Principles of** Mathematics 12 for admission to first year will grant three credits only for this course toward a degree. Prerequisite(s): **Principles of** Mathematics 11 or the equivalent. This course is not open to students with recent credit for **Principles of** Mathematics 12. Students with only **Principles of** Mathematics 11 intending to take MATH 140 and 141 should take MATH 012. [3-0-1]

Rationale: The Provincial secondary school Mathematics program has split in two parts, of which only one is acceptable here.

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page 383, column 2:

Current:

153* (3) Differential Calculus - Derivatives and analytic geometry; applications of differentiation to graphing, optimization, growth-decay problems; numerical applications: Newton's method, tangent line approximation and error estimates. Prerequisite(s): Mathematics 12. [3-1-0]<p>

New:

153* (3) Differential Calculus - Derivatives and analytic geometry; applications of differentiation to graphing, optimization, growth-decay problems; numerical applications: Newton's method, tangent line approximation and error estimates. Prerequisite(s): **Principles of** Mathematics 12. [3-1-0]<p>

Rationale: The Provincial secondary school Mathematics program has split in two parts, of which only one is acceptable here.

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page 383, column 1:

Current:

210 (3) Introduction to Mathematical Computing — Introduction to numerical computation, computer algebra, mathematical graphics. Primarily for second year students taking a degree in mathematics. One hour laboratory each week. Corequisite(s): MATH 220 (or *206*), MATH 221 (or 223), MATH 215 [3–1–0]

New:

210 (3) Introduction to Mathematical Computing — Introduction to numerical computation, computer algebra, mathematical graphics. Primarily for second year students taking a degree in mathematics. One hour laboratory each week. Corequisite(s): MATH 220 (or **226**), MATH 221 (or 223), MATH 215 [3–1–0]

Rationale: Typographical error.

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page 383, column 1:

Current:

215 (3) Elementary Differential Equations I — First–order equations; linear equations; linear systems; trajectory analysis of plane nonlinear systems. Applications of these topics will be emphasized. Credit will be given for only one of MATH 255 and MATH 215. Prerequisite(s): MATH 221 (or MATH 223), and a corequisite MATH 200 (or 226). [3–0–0]

New:

215 (3) Elementary Differential Equations I — First–order equations; linear equations; linear systems; trajectory analysis of plane nonlinear systems. Applications of these topics will be emphasized. Credit will be given for only one of **MATH 215, 255, and 256**. Prerequisite(s): MATH 221 (or MATH 223), and a corequisite MATH 200 (or 226). [3–0–0]

Rationale: Oversight from when MATH 256 was added.

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page 383, column 2:

Current:

226 (3) Advanced Calculus I — Functions of several variables: limits, continuity, differentiability; implicit functions; Taylor's theorem; extrema; Lagrange multipliers; multiple integration, Fubini's theorem; improper integrals. Prerequisite(s): At least 68% in MATH 121 or permission of the **Head of the Department**. Corequisite(s): MATH 221 or 223. Credit will be given for only one of MATH 200, 226, 253. [3–0–0]

New:

226 (3) Advanced Calculus I — Functions of several variables: limits, continuity, differentiability; implicit functions; Taylor's theorem; extrema; Lagrange multipliers; multiple integration, Fubini's theorem; improper integrals. Prerequisite(s): At least 68% in MATH 121 or permission of the **Undergraduate Chair of Mathematics**. Corequisite(s): MATH 221 or 223. Credit will be given for only one of MATH 200, 226, 253. [3–0–0]

Rationale: The Head is too busy for this sort of stuff.

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page 383, column 2:

Current:

227 (3) Advanced Calculus II — Parametrization of curves and surfaces; line and surface integrals; theorems of Green, Gauss, Stokes; applications to physics and/or introduction to differential forms. Prerequisite(s): 68% standing in MATH 226 or permission of the *Head of the Department.* Credit will be given for only one of MATH 317, 227, 254. [3–0–0]

New:

227 (3) Advanced Calculus II — Parametrization of curves and surfaces; line and surface integrals; theorems of Green, Gauss, Stokes; applications to physics and/or introduction to differential forms. Prerequisite(s): 68% standing in MATH 226 or permission of the **Undergraduate Chair of Mathematics**. Credit will be given for only one of MATH 317, 227, 254. [3–0–0]

Rationale: The Head is too busy for this sort of stuff.

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page 383, column 2:

Current:

255* (3) Ordinary Differential Equations — Review of linear systems; nonlinear equations and applications; phase plane analysis; Laplace transforms; numerical methods. Prerequisite(s): MATH 152, 154. Corequisite(s): MATH 253. Credit will be given for only one of MATH 255 or 215. [3–0–0]

New:

255* (3) Ordinary Differential Equations — Review of linear systems; nonlinear equations and applications; phase plane analysis; Laplace transforms; numerical methods. Prerequisite(s): MATH 152, 154. Corequisite(s): MATH 253. Credit will be given for only one of **MATH 215, 255, or 256**. [3–0–0]

Rationale: Oversight from when MATH 256 was added.

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page 383, column 2:

Current:

256 (3) Differential equations - Ordinary and partial differential equations. Particular examples from physics. Laboratories demonstrate graphical and numerical analysis of realistic examples. Corequisites**)**: MATH 253 [3-1-1]

New:

256***** (3) Differential equations - Ordinary and partial differential equations. Particular examples from physics. Laboratories demonstrate graphical and numerical analysis of realistic examples. Corequisites: MATH 253 [3-1-1]

Rationale: For engineering students; Typographical error.

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page 383, column 2:

Current:

266 (3) Vector calculus and complex variables - Elementary vector calculus, basic theory of complex variables suitable for applications. Prerequsite(s): MATH 253. Credit will not be given for MATH 266 if credit has already been given for MATH 300 or MATH 301. [3-0-0]<

New:

266***** (3) Vector calculus and complex variables - Elementary vector calculus, basic theory of complex variables suitable for applications. Prerequsite(s): MATH 253. Credit will not be given for MATH 266 if credit has already been given for MATH 300 or MATH 301. [3-0-0]<

Rationale: MATH 266 is for engineering students.

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page 383, column 2:

Current:

300 (3) Introduction to Complex Variables - Functions of a complex variable, Cauchy-Riemann equations, elementary functions, Cauchy's theorem and contour integration, Laurent series, poles and residues. Corequisite: MATH 317 or 227**or 254**. Credit will be given for only one of MATH 300**or 350**. [3-0-0]

New:

300 (3) Introduction to Complex Variables - Functions of a complex variable, Cauchy-Riemann equations, elementary functions, Cauchy's theorem and contour integration, Laurent series, poles and residues. Corequisite: MATH 317 or 227. Credit will be given for only one of MATH **266** or 300. [3-0-0]

Rationale: Math 254 and MATH 350 no longer exist. The effective replacement of MATH 350 is MATH 266.

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page 383, column 2:

Current:

301 (3) Applied Analysis - Integrals involving multi-valued functions, conformal mapping and applications, analytic continuation, Laplace and Fourier transforms. Prerequisite(s): MATH 300. Corequisite(s): MATH 316 or 257. Credit will be given for only MATH 301**or 350**. [3-0-0]

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page 383, column 2:

New:

301 (3) Applied Analysis - Integrals involving multi-valued functions, conformal mapping and applications, analytic continuation, Laplace and Fourier transforms. Prerequisite(s): MATH 300. Corequisite(s): MATH 316 or 257. Credit will be given for only MATH 301. [3-0-0]

Rationale: Math 350 no longer exists.

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page 383, column 2:

Current:

312 (3) Introduction to Number Theory - Euclidean algorithm, congruences, Fermat's theorem, applications. Some diophantine equations. Distribution of the prime numbers. Prerequisite(s): 12 credits of Mathematics courses. **97/3/11**

New:

312 (3) Introduction to Number Theory - Euclidean algorithm, congruences, Fermat's theorem, applications. Some diophantine equations. Distribution of the prime numbers. Prerequisite(s): 12 credits of Mathematics courses. **[3-0-0]**

Rationale: Typographical error.

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page 383, column 3:

Current:

317 (3) Calculus IV — Parametrizations, inverse and implicit functions, integrals with respect to length and area; grad, div, and curl, theorems of Green, Gauss, and Stokes. Prerequisite(s): MATH 200. Corequisite(s): Corequisite and recommended MATH 221 [3–0–0]

New:

317 (3) Calculus IV — Parametrizations, inverse and implicit functions, integrals with respect to length and area; grad, div, and curl, theorems of Green, Gauss, and Stokes. Prerequisite(s): MATH 200**, 226, or 253**. Corequisite and recommended prerequisite: **MATH 152, 221, or 223**. [3–0–0]

Rationale: Engineering students who used to take MATH 254 (recently deleted) now take MATH 317. This affects a small number of students.

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page 384, column 1:

Current:

345 (3) Applied Nonlinear Dynamics and Chaos — Phase plane methods, bifurcation and stability theory, limit–cycle behavior and chaos for nonlinear differential equations with applications to the sciences. Homework assignments involve the use of computers. At least 68% in mATH 215 or MATH 256. [3–1–0]

New:

345 (3) Applied Nonlinear Dynamics and Chaos — Phase plane methods, bifurcation and stability theory, limit–cycle behavior and chaos for nonlinear differential equations with applications to the sciences. Homework assignments involve the use of computers. At least 68% in **MATH 215, 255, or 256**. [3–1–0]

Rationale: Oversight from when MATH 345 was added.

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page 385, column 1:

Current:

523 (3) Combinational Optimization

New:

523 (3) **Combinattorial** Optimization