# New Course – MATH 533

**1. Will this new course affect a current program?**
Yes [x] No [ ]
If "yes", has a Program Revision Form been submitted concurrently? Yes [x] No [ ]

**2. Teaching Department:**
Mathematics and Statistics

**3. Administering Faculty/Unit:**
Science / Mathematics and Statistics

**4. Campus**
(Downtown, Macdonald, Off Campus, Distance Ed, Other – specify)

**5. Effective Term of Implementation**
(Ex. Sept. 2004 = 200409)
Term:

**6. Responsible Instructor**

**7. Course Title (Limit 30 Characters) - required for all courses:**
Honours Regression and ANOVA

**8. Course Number(s)**
Indicate course number & the number of terms spanned:
(tick all that apply)

- Subject/course number: MATH 533
- Course(s) Span:
  - □ 1 term
  - □ 2 consecutive terms (D1, D2)
  - □ 2 non-consecutive terms (N1, N2)
  - □ 3 consecutive terms (J1, J2, J3)

**9. Course Title to Appear in the Calendar (optional)**
(Limit 59 characters):

Note: This can ONLY be an expansion of word(s) abbreviated in the 30 character course title above.

Honours Regression and Analysis of Variance

**10. Credit Weight**
(or CEU's for non-credit CE courses):
4 Credits

**11. Rationale for new course**
Historically, the teaching of MATH 423, Regression and Analysis of Variance, has suffered from the tension of trying to address too many audiences with the same course. This course, until recently, was taken by undergraduate math majors, undergraduate math/statistics honours, undergraduate minors in statistics and first year graduate students in statistics. The obstacles inherent in addressing so many audiences with a single course are three-fold:

a) Pedagogically: Students have significantly different backgrounds (mathematically and statistically) which makes it difficult to pitch the correct material at the correct level for all students. Although all students should be made aware of the theory underlying all the major results (Gauss-Markov, UMVUE, development of the … (see continuation next page)

**12. Course Description**
(as it will appear in the Calendar [maximum 50 words]):
(N.B. Faculty of Medicine must append complete course outline)

This course consists of the lectures of MATH 423 but will be assessed at the 500 level.

**13. Supplementary information to appear in the Calendar in addition to the course description.**
Such as: equivalent course(s), contact hours, enrolment limitations, language of instruction etc.
Please enter the information as it should appear in the calendar notes.

An additional project or projects assigned by the instructor that require a more detailed treatment of the major results and concepts covered in MATH 423.

C1-1
14. Schedule Types(s):
(Enter all that apply – see course guidelines for a complete list.)
(i.e. Lecture, Labs, Tutorial)

<table>
<thead>
<tr>
<th>Hours per Week</th>
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<td>Lecture</td>
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Total Hours per Week: 3
Total Number of Weeks: 13

15. Projected Enrolment:
13-15

16. Required text and/or preliminary reading list sent to library?
☐ Yes ☐ No

17. Prerequisite(s) (Courses or Tests)
Specify course number(s) or name(s) of test(s):
MATH 357, MATH 247 or MATH 251

If the student does not have a prerequisite should web registration be blocked?
☐ Yes ☐ No

If “Yes” complete A and B:
A. Indicate minimum grade or test score(s) the student must attain in prerequisite course(s) or test(s):

B. Can the prerequisite course(s) or test(s) be taken in the same term as this course?
☐ Yes ☐ No

18. Corequisite(s) Course Number(s):
Specify course number(s) and title(s):

If the student does not register for the corequisite in the same term should web registration be blocked?
☐ Yes ☐ No

19. Restriction(s):
Not open to students who have taken or are taking MATH 423

20. Consultation Reports Attached
☐ Yes ☐ N/A

21. Additional Course Charges (must be approved by the Fee Policy Committee)
Description of Fee (e.g. screening fee)  Amount

22. Requires Teaching, Physical, or Financial Resources
Not Currently Available (attach explanation)
☐ Yes ☐ No
### INFORMATION FOR ADMISSIONS, RECRUITMENT & REGISTRAR’S OFFICE

<table>
<thead>
<tr>
<th>To be completed by the Faculty</th>
<th>To be completed by ARR</th>
<th>For Continuing Education Use</th>
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#### 23. Approvals:

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<th>Routing Sequence</th>
<th>Departmental Meeting</th>
<th>Departmental Chair</th>
<th>Other Faculty</th>
<th>Curric/Academic Committee</th>
<th>Faculty</th>
<th>SCTP</th>
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<tbody>
<tr>
<td>Name</td>
<td>S. W. Drury</td>
<td>D. Wolfson</td>
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Continuation of Rationale for MATH 533:

… F-test for the general linear hypothesis, serious singular value decomposition motivation for the “hat” matrix and ridge regression, etc.), they are not mathematically sophisticated enough for these results to be covered in a rigorous and efficient fashion.

b) Practically: Students need the course for different reasons. Honours students who will be going on to graduate programs (or graduate students IN the grad statistics program) need the course to provide basic fundamental theoretical training in linear models and experimental design AND a serious treatment of applied regression methods in a modern context. Math majors and statistics minors primarily only need the latter, as they are focused on obtaining skills that they can use in the workforce as statisticians.

c) Administrative: The university no longer allows for graduate students to take anything below a 5xx course number for credit. Therefore, they have effectively blocked out our graduate students from a course that is necessary for the students to perform well on for their comprehensive exams (half of the beta covers the linear models material covered MATH 423).

We therefore propose that a new course be created at the 500 level (MATH 5xx: Honours Regression and Analysis of Variance) to alleviate these tensions. As in the tradition of other courses which are taught at the majors and honours level in this department, we will require that students in MATH 5xx attend the lectures of MATH 423, but then complete additional material for the course. In particular, the additional material covered will be additional theoretical treatment of the major results covered in class. The additional theoretical treatment will be done as part of a course project, basically a portfolio of additional problems centred around the additional material that the students will be responsible for.

The new proposal would allow for these tensions to be relieved in many ways. The majors students would receive emphasis on the applied material that is most suited to their needs and background. The honours and graduate students would receive emphasis on the theoretical material most suited to their needs and background. And the department does not have to create a separate course, because the material required for 423 is a subset of the material required for 5xx.