Syllabus

0.1. course. Math 205b: Commutative Algebra
MW 2-3:30
Math Dept Conference Room (on second floor next to math office)

0.2. instructor. Kiyoshi Igusa
305 Goldsmith
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office hours to be announced
webpage for course

0.3. topics covered. Commutative algebra is mainly the study of
ideals in commutative rings. It is the basic prerequisite for algebraic
geometry. This course covers the basic topics of commutative algebra
using elementary concepts from algebraic geometry for intuition and
motivation.

(1) prime and primary ideals
(2) localization
(3) primary decomposition
(4) valuations
(5) completions
(6) dimension theory

0.4. lecture format. Since each class is an hour and a half, I plan
to prepare only an hour’s worth of lecture for each class with a list
of questions for the audience to solve. This means that many of the
details will be skipped and I plan to fill in the details in the notes.

Homework problems will be assigned every week but they are op-
tional.

0.5. books. We will go through the book “Introduction to Commuta-
tive Algebra” by Atiyah and Macdonald with additional material from:

(1) “Commutative Ring Theory” by Matsumura
(2) “Commutative Algebra I,II” by Zariski and Samuel
(3) “Commutative Algebra with a view towards Algebraic Geome-
try” by Eisenbud
(4) “Commutative Algebra” by Bourbaki

0.6. prerequisites. This course assumes basic notions of algebra such
as ideals, modules, tensor product, the basic theorem that integral
domains are contained in their field of quotients, the structure theorem
for modules over PID’s. Thus Math 101a should be sufficient. (See my
Math 101a webpage).