BAEM Program Change:
Addition of
AEM 3101 – Mathematical Modeling and Simulation in Aerospace Engineering
(Approved by AEM faculty 2012-11-26)

Background:

- We have repeated survey, Industrial Visitor, Professional Advisory Board and Student Advisory Board feedback requesting additional Computer Tools in the program.
- Most peer programs have a Matlab based course in their curriculum.
- Changes to Liberal education requirements have resulted in one less 3 credit nominal CLE course in the BAEM program. Provost will not approve any program credit increases.

Changes:

Take one credit from the CLE course reduction and one credit from 4303W and use them to add a two credit required course:

> **AEM 3101 – Mathematical Modeling and Simulation in Aerospace Engineering**
>
> **Catalog Description**: Mathematical modeling of engineering systems and numerical methods for their solution. Use of MATLAB. Focuses on systems found in aerospace engineering and mechanics.
>
> **Credits**: 2
>
> **Text Book**: *Numerical Methods for Engineers and Scientists: An Introduction with Applications Using MATLAB*, by Amos Gilat and Vish Subramiam. Wiley. (ISBN 978-0470565155).
>
> **Prerequisite**: A course in Linear Algebra and Differential Equations. (MATH 2373 or equiv), BAEM Major.
>
> **Grading Basis**: A-F only

This will be a fall junior year course (can't be earlier due to transfer students).
Move AEM 4301 – Orbital Mechanics to Spring of Junior year and AEM 4303W – Flight Dynamics and Control to spring of Senior year. See the updated program on page 2 and the current program on page 3.

Transition Plan:

Year	Fall	Spring
2013-2014	Offer AEM 3101* and not AEM 4301	Offer AEM 4301 and 4303W (advise juniors they need not take 4303W – will be low enrollment)
2014-2015		Last students needing 4303W at 4 credits take it
2015-2016		4303W reduced to 3 credits

* Students under current program can count AEM 3101 as tech elective (with additional AEM 3100 credit or waiving 9th tech elective credit).

BAEM Program with Physics moved, one less Lib Eds, and 4301, 4303W moved, new Matlab Course and 4303W at 3cr.

Freshman year:

Fall		Spring	
MATH 1371 — CSE Calculus I	4	MATH 1372 — CSE Calculus II	4
CHEM 1061/65 — Chemical Principles I	4	PHYS 1301W — Introductory Physics I	4
ENGC 1011/2/3/4 — University Writing and Critical Reading	4	BIOL 1001 — Introductory Biology I: Evolutionary and Ecological Perspectives	4
Liberal Education Elective	3	CSCI 1113 — Introduction to C/C++ Programming for Scientists and Engineers	4

Junior year:

Fall		Spring	
AEM 4201 — Fluid Mechanics	4	AEM 4202 — Aerodynamics	4
AEM 3031 — Deformable Body Mechanics	3	AEM 4501 — Aerospace Structures	3
EE 3005 — Fundamentals of Electrical Engineering	4	**AEM 4301 — Orbital Mechanics**	**3**
EE 3006 — Fundamentals of Electrical Engineering Laboratory	1	AEM 4601 — Instrumentation Laboratory	3
AEM 3101 – Simulation	2	**Liberal Education Elective**	3

Sophomore year:

MATH 2374 — CSE Multivariable Calculus and Vector Analysis	4	MATH 2373 — CSE Linear Algebra and Differential Equations	4
PHYS 1302W — Introductory Physics II	4	AEM 2012 — Dynamics	3
AEM 2011 — Statics	3	AEM 2301 — Mechanics of Flight	3
MATS 2001 — Introduction to the Science of Engineering Materials	3	PHYS 2303 — Introductory Physics III	4
Liberal Education Elective	3		

Senior year:

ME 3324 — Introduction to Thermal Science	3	AEM 4203 — Aerospace Propulsion	4
AEM 4331 — Aerospace Design	4	**AEM 4303W — Flight Dynamics and Control**	**3**
AEM 4602W — Aeromechanics Laboratory	4	Technical Elective	3
Technical Elective	3	Technical Elective	3
Liberal Education Elective	3		

Total credits: 122

Notes:

- Courses that previously required 4303 would now require 3101 and possibly 2301.
- **Transfer students move 2301 to the junior year**: So do we let them push 4301 a year later? Required courses prerequisites don't rule this out (they would not be able to do 4331 space projects or take 4305, as before). If they don't have lib eds. to take they could also possibly take 2301 in spring of the junior year with no other changes (5 technical courses at once), and prerequisites don't rule this out either. The option to do could be decided individually for each student. Currently there are no options for transfer students in this regard.
- **Transfer students** would now be able to take all tech electives. Previously they could not take the ones that require 4303W, as they took 4303W in their senior year.
- The change in physics semesters is an advising change only. Students that come in with AP calculus (a substantial number) can leave physics where it is.
- Addition of 4303W to senior year balances the required course load across the semesters better (electives both technical and liberal education are shown in nominal locations in program above, but are not fixed like the required courses are).

Current BAEM Program (2010-10-6)

Freshman year:

Fall		Spring	
MATH 1371 — CSE Calculus I	4	MATH 1372 — CSE Calculus II	4
PHYS 1301W — Introductory Physics I	4	PHYS 1302W — Introductory Physics II	4
CHEM 1021 — Chemical Principles I	4	BIOL 1001 — Introductory Biology I: Evolutionary and Ecological Perspectives	4
ENGC 1011/2/3/4 — University Writing and Critical Reading	4	CSCI 1113 — Introduction to C/C++ Programming for Scientists and Engineers	4

Sophomore year:

MATH 2374 — CSE Multivariable Calculus and Vector Analysis	4	MATH 2373 — CSE Linear Algebra and Differential Equations	4
PHYS 2503 — Introductory Physics III	4	AEM 2012 — Dynamics	3
AEM 2011 — Statics	3	AEM 2301 — Mechanics of Flight	3
MATS 2001 — Introduction to the Science of Engineering Materials	3	Liberal Education Elective	3
Liberal Education Elective	3		

Junior year:

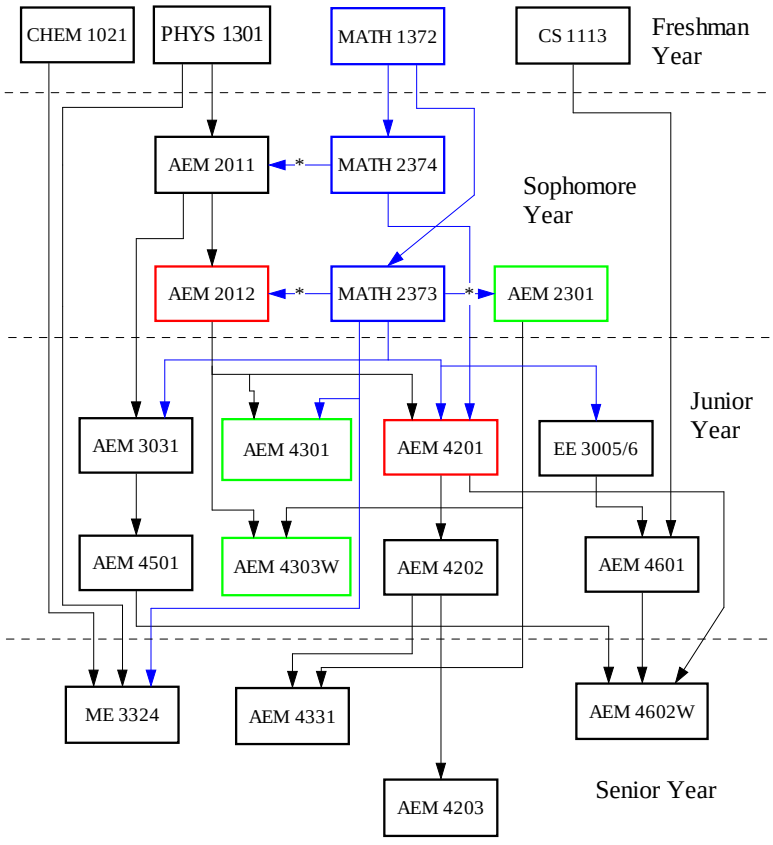
Fall		Spring	
AEM 4201 — Fluid Mechanics	4	AEM 4202 — Aerodynamics	4
AEM 3031 — Deformable Body Mechanics	3	AEM 4501 — Aerospace Structures	3
AEM 4301 — Orbital Mechanics	3	AEM 4303W — Flight Dynamics and Control	4
EE 3005 — Fundamentals of Electrical Engineering	4	AEM 4601 — Instrumentation Laboratory	3
EE 3006 — Fundamentals of Electrical Engineering Laboratory	1	Liberal Education Elective	3

Senior year:

ME 3324 — Introduction to Thermal Science	3	AEM 4203 — Aerospace Propulsion	4
AEM 4331 — Aerospace Design	4	Technical Elective	3
AEM 4602W — Aeromechanics Laboratory	4	Technical Elective	3
Technical Elective	3	Liberal Education Elective	3
Liberal Education Elective	3		

Total Credits: 124

AEM Prerequisite Chains: Required Semester Courses



*: denotes concurrent registration allowed