Proposal to create CE curriculum version 3.2

Last Breaking Revision:	Wednesday 15 August 2007
Last Non-breaking Revision:	Wednesday 29 August 2007 (prereq.)
Approved by Program Faculty:	Wednesday 16 August 2007
Approved by Department Faculty:	<planned 8/31/2007>
Submitted to Curriculum Committee:	<planned 9/2007>
Submitted to EEC:	<planned 10/20007>

Milwaukee School of Engineering
Submitted by: Eric Durant, CE Program Director

This package has 5 parts:

1. Impact of the changes
2. Summary sheet of changes – course listings only
3. Summary of the reasons for the requested change
4. Proposed curriculum
5. Current curriculum

Part 1 of 5: Impact of the changes

EECS Curriculum Changes – Impact on Other Departments

OGP – v. 1.0

Program: Computer Engineering 3.1 → 3.2 **Date: 8/15/2007**

Department	Courses Dropped	Courses Added	Course Change In When Offered
General Studies	None	None	None
Mathematics	None	None	None
Chem/Phys	PH-110, PH-220, PH-230, PH-250	CH-200, PH-2010, PH-2020, PH-2030	None
Mechanical Eng	None	None	None
Business	None	None	None
Nursing	None	None	None
Architectural Eng	None	None	None

Part 2 of 5: Summary of changes: course listings only:

- CE-1900 (2-2-3) is replaced with new course CE-1901 (2-3-3), adding 1 lab hour. Course name remains Digital Logic I: Combinational Systems.
- CE-1910 (2-2-3) is replaced with new course CE-1911 (2-3-3), adding 1 lab hour. Course name remains Digital Logic II: Sequential Systems.
- Drop
    - PH-110 (3-2-4) Physics of Mechanics
    - PH-220 (3-3-4) Physics of Heat, Wave Motion and Optics
    - PH-230 (3-3-4) Physics of Electricity and Magnetism
    - PH-250 (3-3-4) Modern Physics
- Add
    - CH-200 (3-2-4) Chemistry I
    - PH-2010 (3-3-4) Physics I
    - PH-2020 (3-3-4) Physics II
    - PH-2030 (3-3-4) Physics III

Part 3 of 5: Summary of the reasons for the requested change

Two independent changes are proposed:

- Freshmen digital logic courses change in structure from 2-2-3 to 2-3-3. The reasons for this change are:
  - All faculty who taught these courses during their first offering in 2006-2007 noted in their feedback that additional lab time was needed to sufficiently meet the lab objectives, including answering student questions and demoing student projects. Although students are allowed to work in pairs on certain projects, individual work is required for some projects and encouraged or at least allowed for all other projects, increasing learning, but requiring additional faculty time.
  - Several students suggested adding a third lab hour to these courses in their end of term instructor evaluations.
  - Faculty regularly stayed late or added extra office hours most weeks to answer student questions or see demos. Given the various types of hardware involved, these activities could be accomplished much more efficiently in a contiguous block of time.
- The standard four-course core chemistry/physics sequence has been approved by EEC and programs are required to propose curricula implementing it during the 2007-2008 year for implementation in fall, 2008. The four physics courses being dropped are defunct given the new sequence.

BACHELOR OF SCIENCE

COMPUTER ENGINEERING

Model Full-Time Track

		---------- QUARTER ----------		
FRESHMAN YEAR		**1**	**2**	**3**
EN-131	Composition	3-0-3		
SE-1010	Software Development I	2-2-3		
MA-136	Calculus for Engineers I	4-0-4		
HU-100	Contemporary Issues in the Humanities	3-0-3		
OR-100	Freshman Orientation[1]	1-0-0		
MS-221	Microeconomics	3-0-3		
CE-1901	Digital Logic I: Combinational Systems		2-3-3	
SE-1020	Software Development II		2-2-3	
EN-132	Technical Composition		3-0-3	
MA-137	Calculus for Engineers II		4-0-4	
CH-200	Chemistry I		3-2-4	
CE-1911	Digital Logic II: Sequential Systems			2-3-3
CS-2851	Data Structures			2-2-3
EE-2050	Linear Circuits – Steady State I			3-2-4
EN-241	Speech			2-2-3
MA-231	Calculus for Engineers III			4-0-4
	TOTALS	**16-2-16**	**14-7-17**	**13-9-17**

SOPHOMORE YEAR		**4**	**5**	**6**
CE-2800	Embedded Systems Software I	3-3-4		
EE-2060	Linear Circuits – Steady State II	3-3-4		
PH-2010	Physics I	3-3-4		
MA-235	Differential Equations for Engineers	4-0-4		
CE-2810	Embedded System Software II		2-2-3	
EE-2070	Linear Circuits - Transients		3-0-3	
EE-210	Electronic Devices and Computer Interfacing		3-3-4	
MA-230	Discrete Mathematics		4-0-4	
OR-2000	Leadership and Teaming		0-2-1	
CE-2930	Computer Architecture			3-2-4
SE-2890	Software Engineering Practices			2-2-3
PH-2020	Physics II			3-3-4
MA-232	Calculus for Engineers IV			3-0-3
	Elective (HU/SS)[2]			3-0-3
	TOTALS	**13-9-16**	**12-7-15**	**14-7-17**

		---------- QUARTER ----------		
JUNIOR YEAR		**7**	**8**	**9**
CS-3841	Design of Operating Systems	3-2-4		
EE-3050	Dynamic Systems	3-0-3		
MA-383	Linear Algebra	3-0-3		
SS-461	Organizational Psychology	3-0-3		
PH-2030	Physics III	3-3-4		
CS-3212	Computer Graphics		2-3-3	
EE-3720	Control Systems		3-3-4	
MA-262	Probability and Statistics		3-0-3	
OR-402	Professional Guidance		1-0-1	
PH-360	Physics of Electronics		3-3-4	
OR-3000	Applied Servant Leadership		0-2-1	
CE-3910	Embedded Systems Design I			3-2-4
EE-3220	Digital Signal Processing			3-2-4
ME-354	Thermodynamics & Heat Transfer			3-0-3
HU-432	Ethics for Professional Managers and Engineers			3-0-3
IE-423	Engineering Economy			3-0-3
	TOTALS	**15-5-17**	**12-11-16**	**15-4-17**
SENIOR YEAR		**10**	**11**	**12**
CE-4000	Senior Design Project I	2-2-3		
CS-409	Ethical and Professional Issues in Computing	1-0-1		
CE-4920	Embedded Systems Design II	2-2-3		
	Elective (Program)[2]	3-0-3		
	Elective (HU/SS)[2]	3-0-3		
	Elective (Free)[2]	3-0-3		
CE-4010	Senior Design Project II		2-2-3	
CE-4950	Networking I		2-2-3	
	Elective (Program)[2]		3-0-3	
	Elective (HU/SS)[2]		3-0-3	
	Elective (HU/SS)[2]		3-0-3	
CE-4020	Senior Design Project III			2-2-3
CE-4960	Networking II			2-2-3
	Elective (Program)[2]			3-0-3
	Elective (Math/Science)[2]			3-0-3
	Elective (HU/SS)[2]			3-0-3
	TOTALS	**14-4-16**	**13-4-15**	**13-4-15**

[1] Transfer students who have completed 36 quarter or 24 semester credits will be waived from OR-100, but will be required to complete OR-301 Transfer Student Orientation.

[2] There are 30 credits of elective subjects in the Computer Engineering program which must be taken as follows:

- 15 credits of humanities and social sciences: 6 credits of humanities (HU), 6 credits of social science (SS), and 3 credits of humanities or social science
- 9 credits of approved program electives
- 3 credits of approved math/science elective
- 3 credits of an upper-division course from any area

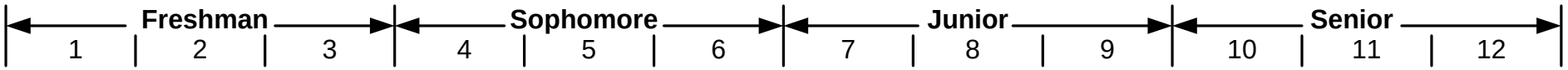
Engineering technology courses may not be used to satisfy requirements of the computer engineering curriculum.

Students enrolled in Air Force ROTC must complete AF-100, AF-200, AF-202, AF-300, AF-301, AF-302, AF-400, AF-401, and AF-402. Upon completion of these courses credit will be given for SS-455 (a social science elective) and the free elective.

Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700)

Computer Engineering Curriculum Flow Chart

Version 3.2



EN-131 3 cr
EN-132 3 cr
EN-241 3 cr
HU-100 3 cr
OR-100 0 cr
MS-221 3 cr
CH-090 or Equivalent
CH-200 4 cr
PH-090 or Equivalent
PH-110 4 cr
MA-126 & MA-127 or Equivalent
MA-136 4 cr
MA-137 4 cr
MA-231 4 cr
Sophomore Standing
SS-461 3 cr
OR-2000 1 cr
HU/SS EL 3 cr
PH2010 4 cr
PH2020 4 cr
PH2030 4 cr
Junior Standing
PH-230 4 cr
PH-220 4 cr
PH-250 4 cr
MA-235 4 cr
MA-230 4 cr
MA-232 3 cr
MA-383 3 cr
MA-262 3 cr
OR-402 1 cr
OR-3000 1 cr
HU-432 3 cr
Senior Standing
CS-409 1 cr
IE-423 3 cr
PH-360 4 cr
ME-354 3 cr
Free EL 3 cr
HU/SS EL 3 cr
HU/SS EL 3 cr
HU/SS EL 3 cr
HU/SS EL 3 cr
M/S EL 3 cr
Prog EL 3 cr
Prog EL 3 cr
Prog EL 3 cr

EL Elective
Pre-requisite
Co-requisite

Planned review and submission to EEC, etc.: Fall, 2007
Implementation per EEC must occur in F'08.

Prerequisite Changes
PH220 -> ME354 becomes PH2030 -> ME354 (confirmed)
PH250 -> PH360 becomes PH2030 -> PH360 (confirmed)
PH110 -> EE3050 becomes PH2010 -> EE3050 (confirmed)

CE1900/1910 2-2-3 change from to CE1901/ CE1911 2-3-3 based on student and faculty feedback and discussions.

EE-2050 4 cr
EE-2060 4 cr
EE-2070 3 cr
EE-210 4 cr
EE-3050 3 cr
EE-3720 4 cr
EE-3220 4 cr
CE-1901 3 cr
CE-1911 3 cr
CE-2800 4 cr
CE-2810 3 cr
CE-2930 4 cr
CS-3841 4 cr
CE-3910 4 cr
CE-4920 3 cr
CE-4950 3 cr
CE-4960 3 cr
SE-1010 3 cr
SE-1020 3 cr
CS-2851 3 cr
SE-2890 3 cr
CS-3212 3 cr
Complete N-2 core courses through junior year or have approved plan with no more than 1 extra quarter
CE-4000 3 cr
CE-4010 3 cr
CE-4020 3 cr

EAD
8/29/2007

BACHELOR OF SCIENCE

COMPUTER ENGINEERING

Model Full-Time Track

		---------- QUARTER ----------		
FRESHMAN YEAR		**1**	**2**	**3**
EN-131	Composition	3-0-3		
SE-1010	Software Development I	2-2-3		
MA-136	Calculus for Engineers I	4-0-4		
HU-100	Contemporary Issues in the Humanities	3-0-3		
OR-100	Freshman Orientation[1]	1-0-0		
MS-221	Microeconomics	3-0-3		
CE-1900	Digital Logic I: Combinational Systems		2-2-3	
SE-1020	Software Development II		2-2-3	
EN-132	Technical Composition		3-0-3	
MA-137	Calculus for Engineers II		4-0-4	
PH-110	Physics of Mechanics		3-2-4	
CE-1910	Digital Logic II: Sequential Systems			2-2-3
CS-2851	Data Structures			2-2-3
EE-2050	Linear Circuits – Steady State I			3-2-4
EN-241	Speech			2-2-3
MA-231	Calculus for Engineers III			4-0-4
	TOTALS	**16-2-16**	**14-6-17**	**13-8-17**

SOPHOMORE YEAR		**4**	**5**	**6**
CE-2800	Embedded Systems Software I	3-3-4		
EE-2060	Linear Circuits – Steady State II	3-3-4		
PH-230	Physics of Electricity & Magnetism	3-3-4		
MA-235	Differential Equations for Engineers	4-0-4		
CE-2810	Embedded System Software II		2-2-3	
EE-2070	Linear Circuits - Transients		3-0-3	
EE-210	Electronic Devices and Computer Interfacing		3-3-4	
MA-230	Discrete Mathematics		4-0-4	
OR-2000	Leadership and Teaming		0-2-1	
CE-2930	Computer Architecture			3-2-4
SE-2890	Software Engineering Practices			2-2-3
PH-220	Physics of Heat, Wave Motion & Optics			3-3-4
MA-232	Calculus for Engineers IV			3-0-3
	Elective (HU/SS)[2]			3-0-3
	TOTALS	**13-9-16**	**12-7-15**	**14-7-17**

		---------- QUARTER ----------		
JUNIOR YEAR		**7**	**8**	**9**
CS-3841	Design of Operating Systems	3-2-4		
EE-3050	Dynamic Systems	3-0-3		
MA-383	Linear Algebra	3-0-3		
SS-461	Organizational Psychology	3-0-3		
PH-250	Modern Physics	3-3-4		
CS-3212	Computer Graphics		2-3-3	
EE-3720	Control Systems		3-3-4	
MA-262	Probability and Statistics		3-0-3	
OR-402	Professional Guidance		1-0-1	
PH-360	Physics of Electronics		3-3-4	
OR-3000	Applied Servant Leadership		0-2-1	
CE-3910	Embedded Systems Design I			3-2-4
EE-3220	Digital Signal Processing			3-2-4
ME-354	Thermodynamics & Heat Transfer			3-0-3
HU-432	Ethics for Professional Managers and Engineers			3-0-3
IE-423	Engineering Economy			3-0-3
	TOTALS	**15-5-17**	**12-11-16**	**15-4-17**
SENIOR YEAR		**10**	**11**	**12**
CE-4000	Senior Design Project I	2-2-3		
CS-409	Ethical and Professional Issues in Computing	1-0-1		
CE-4920	Embedded Systems Design II	2-2-3		
	Elective (Program)[2]	3-0-3		
	Elective (HU/SS)[2]	3-0-3		
	Elective (Free)[2]	3-0-3		
CE-4010	Senior Design Project II		2-2-3	
CE-4950	Networking I		2-2-3	
	Elective (Program)[2]		3-0-3	
	Elective (HU/SS)[2]		3-0-3	
	Elective (HU/SS)[2]		3-0-3	
CE-4020	Senior Design Project III			2-2-3
CE-4960	Networking II			2-2-3
	Elective (Program)[2]			3-0-3
	Elective (Math/Science)[2]			3-0-3
	Elective (HU/SS)[2]			3-0-3
	TOTALS	**14-4-16**	**13-4-15**	**13-4-15**

[1] Transfer students who have completed 36 quarter or 24 semester credits will be waived from OR-100, but will be required to complete OR-301 Transfer Student Orientation.

[2] There are 30 credits of elective subjects in the Computer Engineering program which must be taken as follows:

- 15 credits of humanities and social sciences: 6 credits of humanities (HU), 6 credits of social science (SS), and 3 credits of humanities or social science
- 9 credits of approved program electives
- 3 credits of approved math/science elective
- 3 credits of an upper-division course from any area

Engineering technology courses may not be used to satisfy requirements of the computer engineering curriculum.

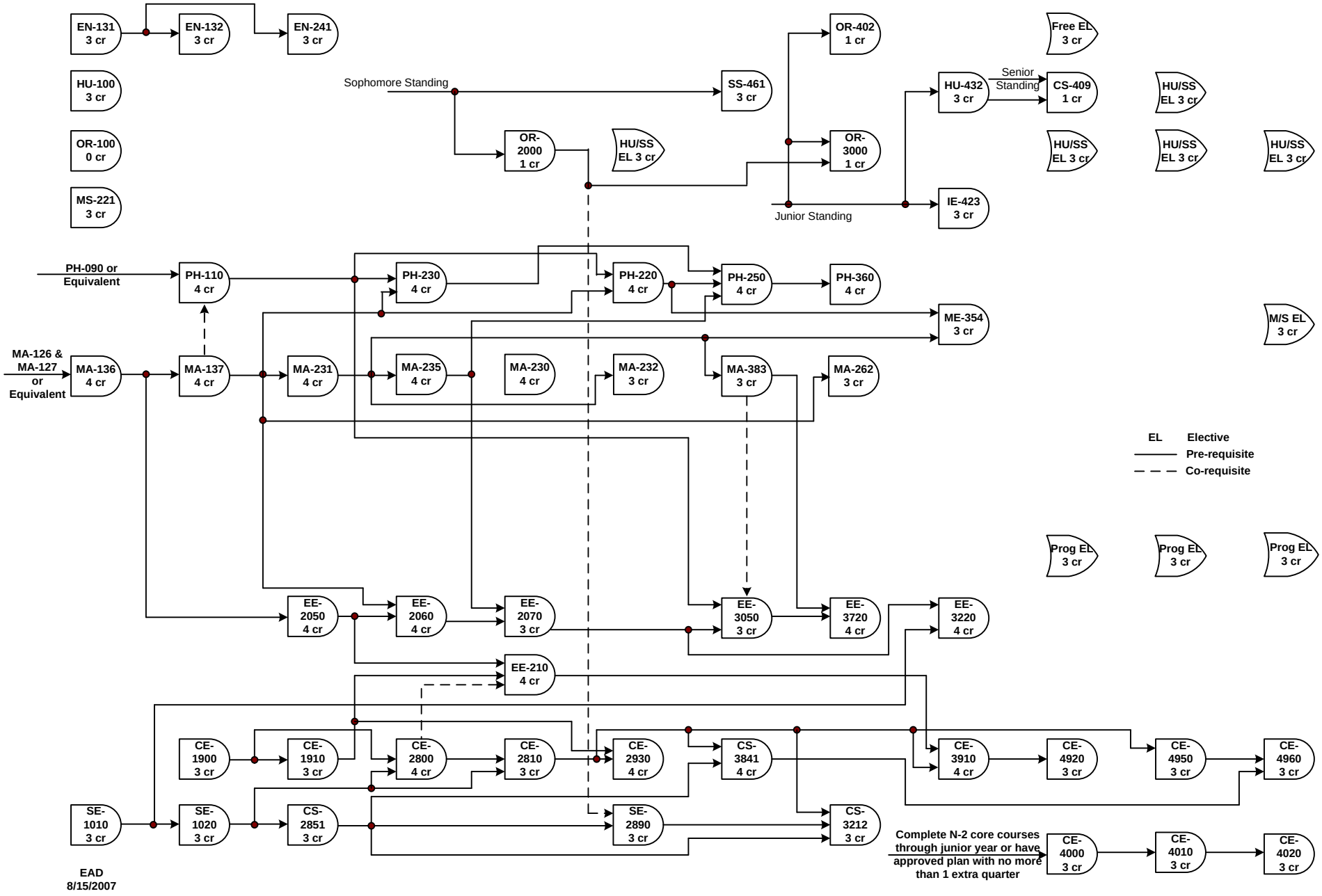
Students enrolled in Air Force ROTC must complete AF-100, AF-200, AF-202, AF-300, AF-301, AF-302, AF-400, AF-401, and AF-402. Upon completion of these courses credit will be given for SS-455 (a social science elective) and the free elective.

Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700)

Computer Engineering Curriculum Flow Chart

Version 3.1

Freshman 1 2 3 | Sophomore 4 5 6 | Junior 7 8 9 | Senior 10 11 12



EAD
8/15/2007