



Memorandum

Date: 27 October 2005
To: University Registrar
From: S.L. Kampe
Materials Science and Engineering
kampe@vt.edu, 231-8688
cc:
RE: 2009 Check sheet changes

Attached for your review and approval is the revised 2009 checksheet for the Bachelor of Science in Materials Science and Engineering (MSE).

Summary of changes relative to the 2007 check sheet (approved by the Registrar 11 April 2005), are as follows (items 1 – 4 were also included as changes to 2008 check sheet, submitted concurrently):

1. ENGE 1024/1114 replaces EF 2984/1016 in Freshman I/II.
2. A new course, MSE 3044 (Transport Phenomena in MSE, 3 cr., Junior II), replaces MSE 3024 (Kinetic Processes, 2 cr., Junior II) and MSE 3034 (Transport Processes, 2 cr., Junior I).
3. MSE 4564 (Polymer Engineering Lab, Junior II) has been removed.
4. A typo on the elective list has been corrected. BSE 3514 (correct) replaces BSE 3415 (incorrect)
5. CHEM 1035/45 replaces CHEM 1074/84 in Freshman I.
6. CHEM 1036 has been added in Sophomore II (concurrence letter from CHEM attached).
7. Program Elective II (Junior I) eliminated.
8. MSE 3054/3064/4354, previously one option within Program Elective II (Junior I), now required for all students (Junior II).
9. MSE 3134 (Junior I) has been modified from 4 credits to 3 credits (course modification proposal submitted).
10. Course rearrangements:
 - ECE 3054 (Electrical Theory) moves from Junior II to Sophomore II
 - MSE 2054 (Fund Mater Sci) moves from Sophomore II to Junior I
 - ISE 2214 (Manuf Proc Lab) moves from Sophomore II to Junior II

All affected students, notably the 2005-06 freshmen, have been notified of the pending changes to the check sheet. This was/will be accomplished via:

1. a session with the freshman during Spring 2006 Advising week to inform them of the proposed and pending changes to the check sheet being considered by governance,
2. the posting and announcement of the "Draft 2009 Check Sheet" on the MSE web site, and
3. notification of students by the academic advising coordinator (Jan Doran) of the changes during normal advising sessions.

Virginia



Tech

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Materials Science and Engineering
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540 231-6640 FAX: 540 231-8919

Memorandum

18 May 2007

To: University Registrar

From: S.L. Kampe
MSE Curriculum Committee

cc:

RE: Revised 2009 MSE Check sheet

Please accept the two minor check sheet revisions as follows:

1. MSE 3204 (Intro to Electronic Materials) was developed, proposed, and approved by governance as a replacement for MSE 2054 (Fundamentals of Materials Science). With 3204's approval, MSE 2054 will no longer be taught. The present revision replaces MSE 2054 with MSE 3204 in Junior I.
2. MSE 4424 name change (from Physical Ceramics Lab to Materials Laboratory II) indicated in Junior I.

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Checksheet Effective Graduating Class of 2009

Freshman Year			Fall	Spring	Sophomore Year			Fall	Spring
CHEM	1035	General Chemistry I	3		MSE	2044	Fund of Materials Eng [2]	3	
CHEM	1045	General Chemistry Lab I	1		MSE	2884	Mat E Prof Dev	1	
ENGE	1024	Engineering Explorations [1]	2		MSE	3304	Physical Metallurgy		3
ENGE	1114	Intro to Engineering II [1]		2	MSE	3314	Physical Metallurgy Lab		1
ENGL	1105/1106	Freshman English I/II	3	3	CHEM	1036	General Chemistry II		3
MATH	1114	Linear Algebra	2		ECE	3054	Electrical Theory		3
MATH	1224	Vector Geometry		2	ESM	2104	Statics	3	
MATH	1205/1206	Calculus I/II	3	3	ESM	2204	Mechanics Deform Bodies		3
PHYS	2305	Foundations of Physics I		4	MATH	2224	Multivariable Calculus	3	
		Elective (Area 6)	1		MATH	2214	Intro Differential Equations		3
		Elective (Area 2/3)		3	PHYS	2306	Foundations of Physics I	4	
							Elective (Area 2/3)	3	
							Program Elective I [3]		2
TOTAL CREDITS			15	17	TOTAL CREDITS			17	18

Junior Year			Fall	Spring	Senior Year			Fall	Spring
MSE	3044	Transport Phenomena in MSE		3	MSE	4055/4056	Mat Select. & Design I/II	3	3
MSE	3134	X-ray Diffraction	3		MSE	4075/4076	Senior Project Lab I/II [5]	1	1
MSE	3204	Intro Electronic Materials	3		MSE	4085/4086	Senior Project Recitation I/II	2	1
MSE	3884	Mat E Prof Dev II		1	MSE	4900	Communications MSE		1
MSE	4034	Thermo of Materials	3		ISE	2014	Engineering Economy [6]	2	
MSE	4414	Physical Ceramics	3				Technical Elective [4]	3	3
MSE	4424	Materials Lab II	1				Technical Elective [4]	3	3
MSE	4554	Polymer Engineering		3			Elective (Area 2/3)	3	
MSE	3054	Mechanical Behavior of Mat		2			Elective (Area 7)		3
MSE	3064	Mechanical Behavior Lab		1					
MSE	4354	Strength and Fracture		1					
ISE	2214	Manufacturing Processes Lab	1						
		Technical Elective [4]		3					
		Elective (Area 2/3)	3						
TOTAL CREDITS			17	14	TOTAL CREDITS			17	15

A total of 130 credits is required for graduation. There are no hidden prerequisites in this program of study. This checksheet assumes two years of high school level foreign language. Students deficient in this requirement may need to take additional credits to satisfy the University foreign language requirement. Any additional credits taken to satisfy the foreign language requirement cannot be used to fulfill degree requirements.

In addition to any University policies regarding satisfactory progress, student must pass MSE 2044, 2884, 3304, and 3314 with a collective GPA of at least 2.0 in order to demonstrate satisfactory progress towards the MSE degree and to be permitted to take any other courses in the major.

A student must achieve an overall GPA of 2.0 and a GPA of 2.0 or better in all MSE courses for graduation.

- Notes:
- [1] Students may substitute ENGE 1024/1104 or EF 1015/1016 for ENGE 1024/1114
 - [2] Transfer students from another department or university may conditionally substitute MSE 2034 for MSE 2044.
 - [3] Program Elective I -Choose EF 2314 C++ (2); STAT 3704 Statistics for Eng (2); ME/MATH 2004 Engineering Analysis Using Numerical Methods (2); or ESM 2074 Computational Methods (3).
 - [4] All technical electives must be taken for a grade (Pass/Fail not acceptable)
 - [5] Honors students may substitute MSE 4095/4096 Honors Senior Project Lab for MSE 4075/4076
 - [6] Students may substitute ECON 2005 Microeconomics (3) for ISE 2014 Engineering Economy

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Elective Requirements Effective Graduating Class of 2009

TECHNICAL ELECTIVES: Fifteen (15) credits are required from the list below. These are categorized into various areas to aid students who might want to emphasize one or more of these subdisciplines. Courses not listed may be counted as Technical Electives only by special approval; initiate requests through the MSE Undergraduate Services Coordinator.

Areas of Potential Emphasis: C = Ceramics; M = Metals; P = Polymers; E = Electronic, magnetic and photonic materials; B = Biomaterials. X = high relevance; x = relevance

	Course	Cr	C	M	P	E	B
MSE	3054	Mech Behavior Materials [2]	2	x	X	x	x
MSE	3064	Mech Behavior Lab [2]	1	x	X	x	x
MSE	3104	Mineralogy	3	X			
MSE	3124	Optical Mineralogy	1	X			
MSE	3424	Crystal Chem & Phase Equil	3	X [1]	X		
MSE	4024	Tribology	3	x	x	x	x
MSE	4124	Extractive Processes	3	x	x		
MSE	4154	NDE of Materials	3	x	x	x	x
MSE	4164	Materials Corrosion	3		X		x
MSE	4234	Semiconductor Processing	3			X	
MSE	4235	Electronic Packaging I [3]	3			X	
MSE	4236	Electronic Packaging II [3]	3			X	
MSE	4254	Thin Films	3	x	x	x	X
MSE	4274	Electronic Packaging Lab	1			x	
MSE	4304	Metals & Alloys	3		X [1]		
MSE	4354	Strength and Fracture [2]	1	x	X	x	x
MSE	4434	Glass and Refractories	3	X [1]		x	
MSE	4534	Polymer & Surface Chem [4]	3		X		
MSE	4574	Biomaterials	3	x	x	x	X [1]
MSE	4604	Composite Materials	3	x	x	x	
BIOL	2405	Human Anatomy & Physiology	3				X
BSE	3514	Phys Props Biological Materials	3				X
CHEM	2535	Organic Chemistry I	3		X [1]		x
CHEM	2536	Organic Chemistry II	3		X		x
CHEM	2545	Organic Chemistry Lab I	1		X		

	Course	Cr	C	M	P	E	B
CHEM	2546	Organic Chemistry Lab II	1			X	
CHEM	3114	Analytical Chem for Life Sci	3	x	x	x	X
CHEM	3615	Physical Chemistry I	3	x	x	x	x
CHEM	3616	Physical Chemistry II	3	x	x	x	x
CHEM	4424	Descriptive Inorganic Chem	3	x	x	x	x
CHEM	4534	Organic Chem of Polymers [5]	3			X	
CHEM	4654	Adhesive & Sealant Sci [4]	3			X	x
ECE	3254	Industrial Electronics	3				X
ECE	4214	Electronics [6]	3			X [1]	
ESM	2074	Computational Methods [2]	3	x	x	x	x
ESM	4024	Adv Mech Behavior Materials	3	x	X		
ESM	4044	Mechanics of Composites	3	x	x	x	
ESM	4054	Solid & Struct Mechanics	3	x	x		
ESM	4105/06	Eng Analysis Phys Systems I,II	3				X
ISE	2204	Manufacturing Processes	2	x	X	x	
MATH	4564	Operational Methods	3	x	x	x	x
PHYS	3405	Intermed Elect & Magn	3				X
PHYS	3455	Quantum & SS Physics I [2]	3				X
PHYS	3456	Quantum & SS Physics II	3				X
PHYS	4614	Optics	3				x
PHYS	4624	Optics Lab	1				x
STAT	4604	Statistical Methods for Eng	3	x	x	x	x

- Notes: [1] Fundamental course recommended for this area of emphasis
[2] These courses may be counted towards the technical elective requirement if not used as a program elective option as presented on the previous page
[3] ECE 3254 is a prerequisite for MSE 4235-36, and this prerequisite must be taken in the summer after Junior year for 4235-36 to be completed in the senior year
[4] MSE 4034 can replace CHEM 3615 as a prerequisite for MSE 4534, and also for CHEM 4654
[5] Prerequisite is CHEM 2536
[6] MSE 2054 can replace ECE 3204 as a prerequisite for ECE 4214

UNIVERSITY CORE CURRICULUM ELECTIVES

- Area 1 – Writing and Discourse is satisfied with the completion of 6 credits of ENGL 1105/1106, and 6 credits of Writing Intensive (WI) credit satisfied by the completion of MSE 4900
Area 4 – Scientific Reasoning and Discovery is satisfied with the completion of 6 credits of lecture and 2 credits of lab from CHEM 1035/1045 and/or PHYS 2305/2306
Area 5 – Quantitative and Symbolic Reasoning is satisfied with the completion of 6 credits of MATH 1205/1206
Area 2 – Ideas, Cultural Traditions, and Values (6 credits) _____
Area 3 – Society and Human Behavior (6 credits) _____
Area 6 – Creativity and Aesthetic Experience (1 credit) _____
Area 7 – Critical Issues in a Global Context (3 credits) _____

If a University Core curriculum course that double counts in two different core areas is selected, unfulfilled credits must be replaced with a free elective so that graduation credits sum to 130.

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VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Academic Affairs

College of Engineering
212 Hancock Hall, Blacksburg, VA 24061-0275
(540) 231-3244 Fax (540) 231-1831

Date: June 1, 2005
To: Engineering Undergraduates
From: Bevlee Watford, Associate Dean, Academic Affairs
Subject: Non-degree credit

Please be aware that not all courses which you have taken at Virginia Tech will count toward an undergraduate engineering degree. Such courses may not be used to satisfy any graduation requirement, including free electives. Listed below are courses which do not count toward an undergraduate engineering degree. You should also check with your engineering department about additional departmental non-credit courses. This list is updated periodically. Be sure to review the list each semester at: http://www.eng.vt.edu/overview/acad_affairs_whatwedo.php

AtSc or COS 2984 (Athletic Transitions, Exploring Careers)

CS 1004 (Computer Literacy), (no credit awarded to CS majors for these courses: CS 4004, 4014)

CEE 4984 (Review of CE Fundamentals of FE Exam)

EDCI 1004, 1014, 2984 (College Success Strategies, Cadet Success Strategies)

EDHL 2984 (First Year Seminar, International Bridge Program, Resident Education, Resident Life, Leadership from International Perspective, Healthy Living, Transition I, II), EDHL 4964 (Field Study), EDHL 4984 (Orientation Skills, Orientation/Peers, Orientation/Leader), EDHL 4974 (Wing Student Teaching Assistant)

EF/ENGE 2984 (Engineering Success Seminar)

Engl 1004, 0014 (English as a Second Language)

ENGR 2984 (C Aspire Seminar, College Success Strategies for Engineers, Engineering Success Strategies, Women in Engineering, Hypatia Seminar, Second Year Hypatia Seminar, Engineering Honors Seminar, Freshman Engineering Seminar, Undergraduate Research Seminar, Mentoring Seminar); ENGR 1014 (Engr Research Seminar); ENGR 1034 (First Year Hypatia Seminar); ENGR 2044 (Second Year Hypatia Seminar); ENGR 1054 (First Year Galileo Seminar); ENGR 3004 (Mentoring Seminar); ENGR 4984 (CEED Team Leader Seminar).

ESM 2984 (ESP Statics), ESM 4404 (Fundamentals of Professional Engineering)

FCD 2984 (Success Project)

HD 2984 (Healthy Living, Success Project)

MaSc 1024 (Mathematics, A Liberal Arts Approach), 1034 (Statistics, A Liberal Arts Approach), 1044 (Computer Science, A Liberal Arts Approach)

Math 1504 (PreCalc), 2984 (Emerging Scholar), 1015 (Elem Calc with Trig. CS majors may receive 1015 credit if taken before 1205), 1016 (Elementary Calc with Trig), 1525-1526 (Elementary Calc with Matrices), 2015-2016 (Elementary Calc with Trig II)

ME 4984 (SAE Automotive Essentials)

Phys 2205-2206 (General Physics, not Calc-based)

Psyc 2984 (First Year Experience, Athletic Transitions)

(6/05 - Edhl, Engr, ME) dp

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2009 MSE Checksheet by category
 130 credits required to graduate

I. Humanities/Social Sciences (22 cr.)

ENGL 1105	Freshman English I	3
ENGL 1106	Freshman English II	3
	Electives CC Areas 2/3, 6, 7	16

II. Math/Statistics (18 cr.)

MATH 1114	Linear Algebra	2
MATH 1224	Vector Geometry	2
MATH 1205	Calculus I	3
MATH 1206	Calculus II	3
MATH 2224	Multivariable Calculus	3
MATH 2214	Intro Differential Eqns	3
	Program Elective I	2

III. Science (18 cr.)

CHEM 1035	General Chemistry I	3
CHEM 1045	General Chemistry Lab	1
CHEM 1036	General Chemistry II	3
MSE 3204	Intro Electronic Materials	3
PHYS 2305	Foundations of Physics I	4
PHYS 2306	Foundations of Physics I	4

IV. Engineering Subjects (23 cr.)

EF 1015	Intro to Engineering I	2
EF 1016	Intro to Engineering II	2
ECE 3054	Electrical Theory	3
ESM 2104	Statics	3
ESM 2204	Deformable Bodies	3
ISE 2014	Engineering Economy	2
ISE 2214	Manufacturing Proc Lab	1
MSE 2044	Fund of Materials Eng	3
MSE 3054	Mech Behavior Mater	2
MSE 3064	Mech Behavior Lab	1
MSE 4354	Strength and Fracture	1

V. MSE Core Courses (37 cr.)

MSE 2044	Fund Materials Eng ¹	1
MSE 3204	Intro Electronic Materials ²	1
MSE 2884	Materials Eng Prof Dev I	1
MSE 3884	Materials Eng Prof Dev II	1
MSE 3024	Kinetic Processes	2
MSE 3034	Transport Processes	2
MSE 3134	X-ray Diffraction	4
MSE 3304	Physical Metallurgy	3
MSE 3314	Physical Metallurgy Lab	1
MSE 4414	Physical Ceramics	3
MSE 4424	Physical Ceramics Lab	1
MSE 4554	Polymer Engineering	3
MSE 4564	Polymer Engineering Lab	1
MSE 4034	Thermo of Materials	3
MSE 4055	Material Sel and Design I	3
MSE 4056	Material Sel and Design II	3
MSE 4075	Senior Project Lab I	1
MSE 4076	Senior Project Lab II	1
MSE 4085	Senior Project Recitation I	2
MSE 4086	Senior Project Recitation II	1
MSE 4894	Communications Portfolio	1

VI. Technical Electives from approved list (15 cr.)

List includes:

- 11 elective courses from MSE
- 4 core courses from MSE
- 1 course from BIOL
- 1 course from BSE
- 9 courses from CHEM
- 2 courses from ECE
- 5 courses from ESM
- 2 courses from GEOL
- 1 course from ISE
- 1 course from MATH
- 1 course from ME
- 5 courses from PHYS
- 1 courses from STAT

VII. Laboratory Experience

CHEM 1045	General Chem Lab
PHYS 2305	Foundations of Physics I
PHYS 2306	Foundations of Physics II
ISE 2214	Manufacturing Proc Lab
MSE 3064	Mechanical Behavior Lab
MSE 3314	Materials Lab I
MSE 4424	Materials Lab II
MSE 2884	Mat Eng Prof Dev I
MSE 3884	Mat Eng Prof Dev II
MSE 7075	Senior Project Lab I
MSE 4076	Senior Project Lab II

¹ Included in Engineering Subjects category

² Included in Science category