

**MEMORANDUM**

To: Second and Third Year Mechanical Engineering Students  
From: Dr. Edward Hensel, PE, Professor and Head email:echeme@rit.edu  
Date: December 2009  
Subject: Dual Degree BS/Masters Programs in Mechanical Engineering  
Dual Degree BS in Mechanical Engineering / MS in Science, Technology, & Public Policy

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I would like to call your attention to three dual degree programs in the Department of Mechanical Engineering. These programs offer outstanding students an opportunity to earn both a Bachelor's and a Master's degree within approximately five years of entry to the BS program. The first dual degree program leads to a Bachelor of Science and a Master of Engineering degrees (BS/MEng) in Mechanical Engineering. The second dual degree program leads to a Bachelor of Science and a Master of Science degrees (BS/MS) in Mechanical Engineering. The third dual degree program leads to a Bachelor of Science in Mechanical Engineering through the College of Engineering and a Master of Science in Science, Technology, and Public Policy through the College of Liberal Arts. Attached you will find a brief description of the dual degree programs and a sample schedule for each.

Application for admission to the dual degree programs are open from Jan 4, 2010 through Feb 19, 2010. To apply for this highly competitive program, please (1) attend the mandatory program information session on Jan 15, 2010, at 1:00 pm in 09-2580, the Xerox Auditorium, (2) send me an application letter requesting admission to the program, (3) submit the attached application form, and (4) submit the names of two faculty members who have agreed to provide letters of recommendation directly to me. One reference should be your faculty advisor, and one reference should be an ME (or Public Policy) faculty member whom you have had in a course. Your application letter should include an explanation of your interest in pursuing a master's degree concurrently with your BS degree. Admission into the dual degree programs is based on the student's cumulative grade point average (which must be at least 3.3 after the completion of second year courses), excellent references, and a compelling letter of application. Admission may be offered at the end of second year. Students may be offered admission in the third year, though the program may take longer than five years to complete.

Admission to the BS/MS Mech E. program may proceed after students have been enrolled in the BS/MEng Mech E. program for approximately one year. If you are interested in the BS/MS Mech. E. program, which requires a thesis, you should enroll in the research methods class during fall of your fourth year to help prepare you for a research career. Admission to the BS/MS Mech. E. program requires a personal interview with the department head, endorsement of an ME faculty graduate advisor, preparation of a formal literature review, the GRE exam, and submission of a formal thesis proposal approved by your endorsing faculty member and the department. After your thesis proposal is accepted, you will be admitted from the BS/MEng Mech E. to the BS/MS Mech. E. dual degree program. Students must complete the admissions process NO LATER THAN winter quarter of their fourth year. Students not completing a successful BS/MS Mech. E. application may continue in the BS/MEng Mech E. dual degree program. Students may apply to the BS/MS Public Policy program directly. Students in the BS/MS Public Policy program will have a faculty advisor both in mechanical engineering and in public policy.

All students admitted to the dual degree programs are required to maintain a quarterly and cumulative grade point average of at least 3.0, and enroll every quarter in graduate seminar 0304-889. Students must achieve a graduate GPA of at least 3.0 in order to be certified for their graduate degree, and comply with all degree requirements for each degree that they earn. Additional details about program requirements will be provided at the information session.

APPLICATION AND CHECKLIST FOR DUAL DEGREE APPLICATIONS  
 SUBMIT THIS FORM TO THE ME RECEPTION DESK IN THE ME OFFICE.  
 (Students Entering Summer Quarter 2009-4)

Check When Done	Due Date	Task
	15 Jan 2010 1:00 pm	Attend Mandatory Program Information Session
	19 Feb 2010 4:00 pm	Insure that your faculty adviser will submit a letter of reference.
	19 Feb 2010 4:00 pm	Insure that an ME or Public Policy Course Instructor will submit a letter of reference.
	19 Feb 2010 4:00 pm	Letter of Application requesting admission to the program, with an explanation of your interest in pursuing the dual degree program
	19 Feb 2010 4:00 pm	Deadline for submission of all application materials.
	19 Feb 2010 4:00 pm	Academic conduct policy signed and attached with your application.
<b>Students will be informed of admission decisions AFTER THE CONCLUSION OF SPRING QUARTER.</b>		

**Please fill in the application form below:** (hand-written submissions are fine)

Applicant's

Name:

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Applicant's

Univ. I.D. Number

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Applicant's

Email address:

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Applicant's

ME Advisor Name:

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ME / Public Policy Instructor

Reference:

Which Program are you interested in?

[ ]	BS / MEng in Mech E	[ ]	BS / MS in Mech E	[ ]	BS Mech E MS STPP
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Please Read  
and Sign This  
Declaration:

I have attended the program information session, have reviewed the guidelines about the dual degree program, and agree to comply with program requirements. I understand that I must maintain a quarterly and cumulative GPA of at least 3.0 if I am admitted to the program, and must demonstrate the highest standards of academic conduct at all times. I understand that I must complete all requirements for both the Bachelor's and Master's degree by Spring of my sixth year. If admitted, I must attend graduate seminar each quarter I am on campus. If I fail to comply with any of these requirements, I may be separated from the dual degree program.

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Applicant Signature

## B.S./M.Eng. Mech. Eng. DUAL DEGREE PROGRAM (Students Entering Summer Quarter 2009-4)

Students in this program work concurrently towards a Bachelor of Science and a Master of Engineering degree in Mechanical Engineering. The B.S./M.Eng. program has a strong career oriented focus, and is primarily directed towards students not considering continued graduate study at the doctoral level. The M.Eng. degree does not include a thesis. Students enrolled in the B.S./M.Eng. dual degree program are required to take on a leadership role in their undergraduate capstone design project. B.S./M.Eng. students take a class in fall of their fifth year, “0304-730 Design Project Management” and subsequently take responsibility for a leadership role on a Multi-Disciplinary Senior Design Team during their fifth year.

All students in the B.S./M.Eng. program are required to complete three courses: Math I, System Modeling, and Computer Implementation of FEM. Students must select four concentration courses from one of numerous concentration areas. Possible concentrations include thermo-fluids, controls, design, manufacturing, business, and customized program of study. The concentration may be significantly interdisciplinary. By design, a student's program may range over several colleges of the Institute in assembling courses which will best help him or her meet his or her professional objectives.

### Sample Course Outline for B.S./M.Eng. Students

(Up to 12 credits may be double counted towards both the BS and MEng Degrees)

Yr	FALL	(16)	WINTER	(15)	SPRING	(17)	SUMMER	(0)	(48)
1	FYE / Fr Sem-051	(1)	FYE / Fr Sem -052	(1)	P.E. Activity	(0)	VACATION	(0)	
	College Chemistry	(4)	Univ. Physics I	(4)	Univ. Physics II	(4)			
	Calculus I	(4)	Calculus II	(4)	Calculus III	(4)			
	Liberal Arts	(4)	Liberal Arts	(4)	Liberal Arts	(4)			
	Matl. Proc., Lab	(3)	Engr. Des. Graphics	(2)	Prob. Solv. w/ Comp.	(3)			
					MIC Lab	(2)			
Yr 2	FALL	(16)	WINTER	(17)	SPRING	(18)	SUMMER	(0)	(51)
	Statics	(4)	Mechanics	(4)	Dynamics	(5)	CO-OP	(0)	
	Univ. Physics III	(4)	Thermodynamics	(4)	Fluid Mechanics	(4)			
	Multi-Variable Calc	(4)	Differential Equations	(4)	Matrices & BVP	(4)			
	Liberal Arts	(4)	Sci Elec I	(4)	Liberal Arts	(4)			
P.E. Activity	(0)	Mechanics Lab	(1)	ThermoFluids Lab I	(1)				
Yr 3	FALL	(18)	WINTER	(16)	SPRING	(0)	SUMMER	(0)	(34)
	Cornerstone Design	(2)	Matl. Science, Lab	(4)	CO-OP		CO-OP	(0)	
	Des. Mach. Elem.	(4)	Num. Methods	(4)					
	Engrg Statistics	(4)	Heat Transfer	(4)					
	Liberal Arts	(4)	Circuits I	(4)					
	<i>GradCore1 = 0304-870 Math Engrs I</i>	(4)							
<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)						
Yr 4	FALL	(18)	WINTER	(16)	SPRING	(16)	SUMMER	(0)	(50)
	Liberal Arts	(4)	Liberal Arts	(4)	Liberal Arts	(4)	CO-OP	(0)	
	System Dynamics	(5)	Adv. Comp. Tech.	(4)	<i>TechElective3 = GradElective4</i>	(4)			
	Transport Phenom.	(4)	<i>TechElective2 = GradElective3</i>	(4)	<i>GradConcentration1</i>	(4)			
	Tech. Elective 1	(4)	<i>GradCore2 = 0304-823 Sys Modeling</i>	(4)	<i>GradCore3 = 0304-865 Comp Imp FEM</i>	(4)			
	ThermoFluids Lab II	(1)							
<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)				
Yr 5	FALL	(16)	WINTER	(16)	SPRING	(16)	SUMMER	(0)	(48)
	Free Elective 1	(4)	Free Elective 2	(4)	Free Elective 3	(4)		(0)	
	<i>GradElec1 = 0304-730 Des Proj Mgmt</i>	(4)	Science Elective II	(4)	<i>Tech. Elective 4 = GradElective5</i>	(4)			
	<i>GradConcentration2</i>	(4)	Senior Des. I	(4)	<i>GradConcentration4</i>	(4)			
	<i>GradElec2</i>	(4)	<i>GradConcentration3</i>	(4)	Senior Des. II	(4)			
<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)				

Courses used towards the M Eng Degree are in italics

Students in the B.S./M.Eng. program are normally expected to complete the requirements for the two degrees during the spring of their fifth year. Extensions beyond spring of the sixth year will not be approved.

## B.S./M.S. Mech. Eng. DUAL DEGREE PROGRAM (Students Entering Summer Quarter 2009-4)

Students in this program work concurrently towards a Bachelor of Science and a Master of Science degree in Mechanical Engineering. The B.S./M.S. program has a strong research oriented focus, and is primarily directed towards students planning on completing a doctoral degree or working in an industrial research setting. All students enrolled in the B.S./M.S. program are required to complete a graduate thesis and conduct scholarly research. Students are required to complete two courses Math I, Math II, and must develop a graduate focus area of study, with prior approval from their adviser and the department head. The focus area should consist of at least 12 credits of graduate study in mechanical engineering, (0304-7xx or higher) and be related to the student's technical and professional development interests. Examples of focus areas include controls, materials science, thermo/fluids, and mechanics/design. Students desiring to enter the B.S./M.S. program are required to be accepted for thesis work by a graduate advisor, and prepare a formal thesis proposal, with a comprehensive literature review, prior to admission into the B.S./M.S. program. Students considering the B.S./M.S. program may take a "Research Methods" class in fall of their fourth year to begin working on their literature review and identify a thesis topic. Students must complete an acceptable thesis proposal and literature review by the end of Fall of their fourth year to be eligible for the B.S./M.S. program. **Admission to the B.S./M.S. program reflects a commitment on the part of both the student and faculty advisor, and is generally not reversible.**

### Sample Course Outline for B.S./M.S. Students

(Up to 12 credits may be double counted towards both the BS and MS Degrees)

Yr	FALL	(16)	WINTER	(15)	SPRING	(17)	SUMMER	(0)	(48)
1	FYE / Fr Sem-051	(1)	FYE / Fr Sem -052	(1)	P.E. Activity	(0)	VACATION		
	College Chemistry	(4)	Univ. Physics I	(4)	Univ. Physics II	(4)			
	Calculus I	(4)	Calculus II	(4)	Calculus III	(4)			
	Liberal Arts	(4)	Liberal Arts	(4)	Liberal Arts	(4)			
	Matl. Proc., Lab	(3)	Engr. Des. Graphics	(2)	Prob. Solv. w/ Comp.	(3)			
				MIC Lab	(2)				
Yr 2	FALL	(16)	WINTER	(17)	SPRING	(18)	SUMMER	(0)	(51)
	Statics	(4)	Mechanics	(4)	Dynamics	(5)	CO-OP		
	Univ. Physics III	(4)	Thermodynamics	(4)	Fluid Mechanics	(4)			
	Multi-Variable Calc	(4)	Differential Equations	(4)	Matrices & BVP	(4)			
	Liberal Arts	(4)	Science Elective I	(4)	Liberal Arts	(4)			
P.E. Activity	(0)	Mechanics Lab	(1)	ThermoFluids Lab I	(1)				
Yr 3	FALL	(18)	WINTER	(20)	SPRING	(0)	SUMMER	(0)	(38)
	Cornerstone Design	(2)	Matl. Science, Lab	(4)	CO-OP		CO-OP		
	Des. Mach. Elem.	(4)	Num. Methods	(4)					
	Engrg Statistics	(4)	Heat Transfer	(4)					
	Liberal Arts	(4)	Circuits I	(4)					
<i>GradCore1 = 0304-870 Math Engrs I</i>	(4)	Liberal Arts	(4)						
<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)						
Yr 4	FALL	(18)	WINTER	(20)	SPRING	(16)	SUMMER	(0)	(54)
	System Dynamics	(5)	Liberal Arts	(4)	Liberal Arts	(4)	Research CO-OP		
	Transport Phenom.	(4)	Adv. Comp. Tech.	(4)	<i>TechElective3 = GradElective3 6xx</i>	(4)			
	Tech. Elective 1	(4)	<i>TechElective2 = GradElective2 7xx</i>	(4)	<i>TechElective4 = GradElective4 6xx</i>	(4)			
	ThermoFluids Lab II	(1)	Senior Des. I	(4)	Senior Des. II	(4)			
<i>GradElec1 = 0304-701 Research Meth.</i>	(4)	<i>GradCore2 = 0304-871 Math Engrs II</i>	(4)						
<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)				
Yr 5	FALL	(9)	WINTER	(16)	SPRING	(12)	SUMMER	(0)	(37)
	Free Elective 1	(4)	Free Elective 2	(4)	Free Elective 3	(4)	Research Work Thesis (r)		
			Science Elective II	(4)					
	<i>GradFocus1</i>	(4)	<i>GradFocus2</i>	(4)	<i>GradFocus3</i>	(4)			
	<i>Thesis</i>	(1)	<i>Thesis</i>	(4)	<i>Thesis</i>	(4)			
<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)	<i>Grad Seminar</i>	(0)				
	(77)		(88)		(63)		(0)	(228)	

*Courses used towards the M Sci Degree are in italics*

Students in the B.S./M.S. program are expected to complete the requirements for the two degrees no later than fall of their sixth year, **including defense of their thesis**. An extension to complete the M.S. portion of the dual degree program may be granted on a case-by-case basis. The extension, however, cannot extend beyond May 15<sup>th</sup> of the sixth program year. Students not completing all requirements for both degrees by May 15<sup>th</sup> of year 6 will automatically be separated from the dual degree program, and must take 12 additional credits of graduate course work to complete the Master's degree.

## **B.S. Mech. Eng. / M.S. Science, Technology, & Public Policy Dual Degree Program**

(Example Program of Study for Illustration Purposes)

Students in this program work concurrently towards a Bachelor of Science in Mechanical Engineering and a Master of Science degree in Science Technology and Public Policy. The **BS Mech E / MS STPP** program has a public policy research focus, and is directed towards students interested in using their technical preparation as an engineer to help shape future policy decisions.

It is a cliché that technology has become a major driver, perhaps the most important driver, of social, political and economic change. It follows then that engineers will increasingly shape the direction of those changes, and it is important that engineers understand how their future actions directly and indirectly affect all of our lives.

Just as engineers have an important role in shaping public policy, engineering activities, careers, and the profession itself are greatly influenced by public policies. Whether it is the recent public discussion over U.S. innovation and competitiveness policy, given the technological advancements of India and China, or the significant increase in education required for engineering licensure, the engineering profession is being profoundly changed by public policy. Moreover, policies affecting how we as a society live and work—such as environmental policy, industrial policy, energy policy, and national security policy, to name a few—demand that engineers be prepared to integrate policy issues into their engineering practice.

Yet the vast majority of engineers have little knowledge of public policy, and most policymakers have little firsthand knowledge about the many technologically-steeped decisions they make. This disparity was recently recognized by the National Academy of Engineering (NAE). *The NAE has called for new curricula in engineering and public policy to bridge this gap.*

In its recent report, *Educating the Engineer of 2020*, the NAE stated that engineering curricula that integrate public policy “could serve as a recruiting tool ... [and] an optimum launch pad to challenging and rewarding professions – engineering first and foremost, but also medicine, law and business.” In noting the increased convergence between engineering and public policy, NAE found,

*“This new level of interrelatedness necessitates that engineering, and engineers, develop a stronger sense of how technology and public policy interact. To date, engagement of engineers in public policy issues has been limited at best. It is both the responsibility of engineers and important to the image of the profession that engineers increase their ability to eloquently articulate the relevance of engineering to many public policy issues.”*

This dual degree program provides an integrated engineering/public policy curriculum, and is supported by faculty in both the Department of Mechanical Engineering and the Department of STS/Public Policy (which houses the MS in STPP). Students may benefit from a **liberal arts concentration in public policy**, a minor in public policy, or the **dual degree** with engineering and public policy. A typical plan that integrates the BS in Mechanical Engineering, one of the *ME Options (such as Energy & the Environment)*, and the MS in STPP is shown on the table below.

**Typical Course Sequence for the BS Mech E / MS STPP Dual Degree Program**  
**w/ Undergraduate Mech Eng Option and Undergraduate Policy Analysis COLA Concentration**

Year 1 - FALL		Year 1 - WINTER		Year 1 - SPRING		Year 1 - SUMMER	
COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR
FYE/Fr Sem -051	1	FYE/Fr Sem -052	1	P.E. Activity	0	Vacation	
College Chemistry	4	Univ. Physics I	4	Univ. Physics II	4		
Calculus I	4	Calculus II	4	Calculus III	4		
COLA Core	4	COLA Core*	4	COLA Core	4		
Matl. Proc. Lab	3	Prob. Solv. w/Comp.	3	MIC Lab	2		
Engr. Des. Graphics	2						
<b>Total Credits</b>	<b>18</b>	<b>Total Credits</b>	<b>16</b>	<b>Total Credits</b>	<b>14</b>	<b>Total Credits</b>	

\*Winter COLA Core first year should be STV learning community with emphasis on engineering and public policy.

Year 2 - FALL		Year 2 - WINTER		Year 2 - SPRING		Year 2 - SUMMER	
Course Title	CR	COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR
Statics	4	Mechanics	4	Dynamics	5	Co-op	0
Univ. Physics III	4	Mechanics Lab	1	COLA Core	4		
Sci. Elec I	4	Multi-Variable Calc	4	Matrices & BVP	4		
COLA Core	4	Differential Equations	4	Fluid Mechanics	4		
P.E. Activity	0	Thermodynamics	4				
		Apply to Program		Apply to Program			
<b>Total Credits</b>	<b>16</b>	<b>Total Credits</b>	<b>17</b>	<b>Total Credits</b>	<b>17</b>	<b>Total Credits</b>	

Year 3 - FALL		Year 3 - WINTER		Year 3 - SPRING		Year 3 - SUMMER	
COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR
Cornerstone Design	2	Matl. Science, Lab	4	Co-op	0	Co-op	
Des. Mach. Elem.	4	Num. Methods	4				
Engrg Statistics	4	Heat Transfer	4				
ThermoFluids Lab I	1	FE 2 STPP MS Elec	4				
Circuits 1	4						
FE 1 Contemp. Issues	4						
<b>Total Credits</b>	<b>19</b>	<b>Total Credits</b>	<b>16</b>	<b>Total Credits</b>	<b>0</b>	<b>Total Credits</b>	

Year 4 - FALL		Year 4 - WINTER		Year 4 - SPRING		Year 4 - SUMMER	
COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR
Transport Phenom.	4	Adv. Comp Tech.	4	Science Elective II	4	Co-op	0
ThermoFluids Lab II	1	System Dynamics	5	COLA Core	4		
Tech. Elec. 1	4	STPP MS Core: Pub Adm/Mgmt 0521-709	4	STPP MS Core: Eval	4		
STPP MS Core: Rdngs in PP 0521-700	4	COLA PP Conc: PA II	4	COLA PP Conc PA III	4		
COLA PP Conc: PA I **	4						
<b>Total Credits</b>	<b>17</b>	<b>Total Credits</b>	<b>17</b>	<b>Total Credits</b>	<b>16</b>	<b>Total Credits</b>	

\*\*If students take the PA sequence prior to entering the BS/MS program, the courses may be taken at the 400 level. If this is the case then students would register for 12 credits of 700 level courses for their Technical Electives (or 12 credits of additional courses at the 700 level).

Year 5 - FALL		Year 5 - WINTER		Year 5 - SPRING		Year 5 - SUMMER	
COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR	COURSE TITLE	CR
Senior Des. I	4	Senior Des. II	4	FE3 STPP MS Elec	4		
Tech. Elective 2	4	Tech. Elective 3	4	Tech. Elective 4	4		
STPP MS Core: STP 0508-780	4	STPP MS Core: Adv Th. & Methods in PA (0521-701)	4				
Spec. Top.: Res Design	4	MS STPP Thesis	4	MS STPP Thesis	6		
<b>Total Credits</b>	<b>6</b>	<b>Total Credits</b>	<b>16</b>	<b>Total Credits</b>	<b>14</b>	<b>Total Credits</b>	

TOTAL Mechanical Engineering Undergraduate Degree Requirements (Black + Red)	195 (180 State Minimum)
TOTAL MS STPP Graduate courses (Blue + Red)	46 (45 State Minimum)
Less: Double Counted Credits	-12
<b>Total Credits</b>	<b>229</b>

NOTE: The fourth year COLA PP Concentration sequence called Policy Analysis I-III will have a 700 number TBD. The course will be counted towards the MS degree, but will also be allowed to count for the undergraduate Public Policy COLA concentration.