Curriculum Checklist - ITU Dual Degree Program in Bioengineering						146 total credits			
2012-2014 CATALOG	Effective FALL 2014								
		S. Thomas							
YEAR 1:	ISTANBUL TECHNICAL UNIVERSITY								
FALL SEMESTER						MSU or ITU Course Equivalent:			
Course #	**Course Title**	**Credits**	Hours	**Grade**		**Sub #**	**Sub Title**	**Sub Cr**	
BEN 107	Art of Engineering (MSU CORE IA)	3				*IA CORE*		*3*	
BEN 111	Intro to Bioengineering (Biochem/Biotechnology)	2	(2 + 0)			*EBIO 100*	*Intro to Biological Engr*	*2*	
CHE 101	Chemistry I (with Lab)	4	(3 + 2)			*CHMY 141*	*College Chemistry I*	*4*	
CMP 103	Intro to Computers and Information Systems	2	(2 + 0)			*CAPP120*	*Introduction to Computers*	*2*	
MTH 103	Calculus I	4	(3 + 2)			*M 171Q*	*Calculus I*	*4*	
PHY 103	Physics I (with lab)	4	(3 + 2)			*PHSX 220*	*Physics I (w/ calculus)*	*4*	
TUR 101	Turkish I	2	(2 + 0)			*ELEC 100*	*Turkish I*	*2*	
ULP 101	New Begin.Fresh.Sem&Serv.to Leader.I	0					*No direct equivalent*	*2*	
	Total Credit Hours	*21*							
SPRING SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		***Sub #***	***Sub Title***	***Sub Cr***	
MTH 104	Calculus II	4	(3 + 2)			*M 172Q*	*Calculus II*	*4*	
PHY 104	Physics II (with lab)	4	(3 + 2)			*PHSX 222*	*Physics II (w/ calculus)*	*4*	
CHE 301	Chemistry II	4	(2 + 2)			*CHMY 143*	*College Chemistry II*	*4*	
CMP 102	Intro to Scientific and Engineering Computing	2	(2 + 0)			*EGEN 102*	*Intro to Engr Comp Appl*	*2*	
BIO 101	General Biology (MSU CORE IN)	3				*BIOB 170IN*	*Princples Biological Diversity*	*3*	
TUR 102	Turkish II (MSU CORE D)	2	(2 + 0)			*ELEC 100 D*	*Turkish II*	*2*	
GED 037	Knowledge, Language and Logic (MSU CORE IH)	3	(3 + 0)			*ELEC 100 IH*	*Knowledge, Lang & Logic*	*3*	
ULP 102	New Begin.Fresh.Sem&Serv.to Leader.II	0					*No direct equivalent*		
	Total Credit Hours	*22*							
YEAR 2:	MONTANA STATE UNIVERSITY								
FALL SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		***Sub #***	***Sub Title***	***Sub Cr***	
M 273	Calculus III	4	(4 + 0)			*MATH 120*	*Calculus with Analytic Geometry*	*4*	METU Univ.
CHMY 211	Elements of Organic Chemistry	5	(4 + 3)			*KIM 104E*	*Organic Chemistry WITH LAB required*	*4*	ITU
ECHM 215	Elementary Principles I	3	(3 + 0)				*No direct equivalent*		
WRIT 101W	College Writing I	3	(3 + 0)				*No direct equivalent*		
	Total Credit Hours	*15*							
SPRING SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		***Sub #***	***Sub Title***	***Sub Cr***	
M 274	Introduction to Differential Equations	4	(4 + 0)			*MAT 201E or MAT 232E*	*Differential Equations*	*4*	ITU
BCH 380	General Biochemistry (with lab)	5	(4 + 3)				*No direct equivalent*		
EBIO 216	Principles of Biological Engineering	3	(3 + 0)				*No direct equivalent*		
ECHM 321	Fluid Mechanics Operations	3	(3 + 0)			*AKM 204E*	*Fluid Mechanics or*	*3*	ITU
-- ECHM 321	Additional equivalent					*CIE 354*	*Fluid Mechanics*	*3*	ITU
COM 110US	Public Communication	3	(3 + 0)				*No direct equivalent*		
	Total Credit Hours	*18*							

YEAR 3:	ISTANBUL TECHNICAL UNIVERSITY								
FALL SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		***Sub #***	***Sub Title***	***Sub Cr***	
ATA 101	History of the Turkish Revolution I	2	(2 + 0)				*No direct equivalent*		
BEN 102	Microbiology	3	(2 + 2)			*BIOM 360*	*General Microbiology*	*3 [5]*	
BEN 321	Reactor Kinetics and Design in Biotechnology	3	(3 + 0)			*EBIO 438*	*Bioprocess Engineering*	*3*	
BEN 323	Materials Science	3				*EMAT 251*	*Materials Structures and Properties*	*3*	
BEN 352	Transport Processes in Bioengineering	3	(3 + 0)			*EBIO 324*	*Bioengineering Transport*	*3*	
	Bioengineering Elective	3					*SEE BELOW*		
	Total Credit Hours	*17*							
SPRING SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		***Sub #***	***Sub Title***	***Sub Cr***	
ATA 102	History of the Turkish Revolution II (MSU CORE IS)	2	(3 + 0)			*ELEC100IS*	*No direct equivalent*		
BEN 324	Bioengineering Lab I	3				*EBIO 442*	*Bioengineering Lab I*	*3*	
BEN 326	Genetics	3	(3 + 0)			*BIOB 375*	*General Genetics*	*3*	
BEN 351	Bioengineering Thermodynamics	3	(3 + 0)			*ELEC 300*	*Bioengineering Thermodynamics*	*3*	
	Bioengineering Elective	3							
	Technical Elective	3							
	Total Credit Hours	*17*							
YEAR 4:	MONTANA STATE UNIVERSITY								
FALL SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		***Sub #***	***Sub Title***	***Sub Cr***	
EBIO 411R	EBIO Design I (Senior/Graduation Project)	3	(2 + 2)				*No direct equivalent*	*3*	
EGEN 310R	Introduction to Engineering Design	3	(3 + 0)				*No direct equivalent*	*3*	
STAT 332	Statistics for Scientists and Engineers	3	(3 + 0)			*ISL 213E*	*Statistics I (First choice)*	*3*	ITU
-- STAT 332	Additional equivalent		3			*MAT 271E*	*Probability and Statistics (2nd choice)*	*3*	ITU
	Engineering Elective (ECHM 442 **strongly** recommended)	3	(3 + 0)					*3*	
	Engineering Elective	3	(3 + 0)					*3*	
	Bioengineering Elective	3	(3 + 0)						
	Total Credit Hours	*18*							
SPRING SEMESTER									
Course #	**Course Title**	**Credits**	Hours	**Grade**		**Sub #**	**Sub Title**	**Sub Cr**	
EBIO 439	Downstream Processing	3	(3 + 0)				*No direct equivalent*		
EBIO 412R	EBIO Design II	3	(3 + 0)				*No direct equivalent*		
EBIO 443	Bioengineering Laboratory II	3	(4 + 0)				*No direct equivalent*		
ECHM 451	Process Dynamics & Control	3	(3 + 0)				*No direct equivalent*		
	Engineering Elective	3	(3 + 0)						
	Bioengineering Elective	3	(0 + 6)						
		0							
	Total Credit Hours	*18*							

POSSIBLE ELECTIVES AT ITU:								
BEN312	Enzymology	3				ELEC300	Enzymology	3
BEN332	Env Biotechnology	3				BIOB375	Gen. Genetics	3
BEN 335	BIOSENSORS	3					*No direct equivalent*	
BEN 337	Biofuels and Bioenergy	3					*No direct equivalent*	
BEN 341	BIOMATERIALS	3					*No direct equivalent*	
BEN322	Exp. Design & Modeling in Bioe	3					*No direct equivalent*	