Curriculum Checklist - ITU Dual Degree Program in Bioengineering			145 credits		k:advising/BIOE degree/checklists/DW ITU DDP 2015 checklist and equiv		
2014-2015 CATALOG	Effective FALL 2015		ITU cr. 77		Student:		
	S. Thomas		MSU cr. 68		ID:		
YEAR 1:	**ISTANBUL TECHNICAL UNIVERSITY**				Grad. Date:		
	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*	*No direct equivalent*	*3*
BEN 111	Intro to Bioengineering (Biochem/Biotechnology)	2	(2 + 0)		*EBIO 100*	*Intro to Biological Engr*	*2*
CHE 101	Chemistry I (with Lab) (MSU CORE IN)	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 (MSU CORE IN)	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	3			*BIOB 170IN*	*Princples Biological Diversity*	*3*
TUR 102	Turkish II	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)		*MAT 213E*	*Mathematics III*	*4*
CHMY 211	Elements of Organic Chemistry	5	(4 + 3)		*KIM 104E*	*Organic Chemistry WITH LAB required*	*4 ITU (5 req.-1 cr)*
ECHM 201	Elementary Principles of Chemical & Biological Engr	3	(3 + 0)			*No direct equivalent*	
WRIT 101W	College Writing I (MSU CORE W)	3	(3 + 0)			*No direct equivalent*	
EGEN 350	Applied Engr Data Analysis	2			*ISL 213E*	*Statistics I (First choice)*	
	Total Credit Hours	*17*			*MAT 271E*	*Probability and Statistics (2nd choice)*	

	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*
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*
-- ECHM 321	Additional equivalent				*CIE 354*	*Fluid Mechanics*	*3*
COMX 111US	Intro. To Public Speaking (MSU CORE US)	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*
	Engineering Elective **(ECHM 442 strongly recommended)**	3	(3 + 0)				[see BIOE Engineering Elec. List]	*3*
	Engineering Elective	3	(3 + 0)				[see BIOE Engineering Elec. List]	*3*
	Bioengineering Elective	3	(3 + 0)				[see BIOE Bioengr. Elec. List]	
	Total Credit Hours	*15*						

	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)				[see BIOE Engineering Elec. List]	
	Bioengineering Elective	3	(0 + 6)				[see BIOE Bioengr. Elec. List]	
	Total Credit Hours	*18*						

POSSIBLE ELECTIVES AT ITU:								*Sub Cr*
BEN312	Enzymology	3				ELEC300	Enzymology	3
BEN332	Env Biotechnology	3					*No direct equivalent*	
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*	