Appendix I: Completion of UMES Engineering BS requirements in the SU-UMES Physics/Engineering Dual-Degree Program (Academic Year 2020-2021)

Course Names	Req. Cr.	SU Course	UMES Cr.	SU Course	Comments
General Education: 40 Credits					
Students must complete all General Education requirements at SU. General Education credits are block transferred to UMES to meet the General Education requirement at UMES per COMAR per COMAR 13b.06.01.04 F(2) ***A completed general education program shall transfer without further review or approval by the receiving institution and without the need for a course-by-course match***. Students must include Calculus I (MATH 201) and Physics I (PHYS 221), with grades of C or better in their general education program for transfer.					
Supporting Science and Mathematics Math Requirements: 19 Credits					
MATH 211 Calculus II	4	4		MATH 202 Calculus II [1]	
MATH 212 Calculus III	4	4		MATH 310 Calculus III [1]	
MATH 241 DE for Engineers	3	3		MATH 311 Diff Equations I [1]	
PHYS 262 Gen. Physics II	3	4		PHYS 223 Physics II [1]	
PHYS 264 Gen. Physics II Lab.	1				
PHYS 263 Gen. Physics III	3	3		PHYS 313 Intro to Modern Physics [1]	Substitute 1 credit from PHYS 313
PHYS 265 Gen. Physics III Lab.	1	1		PHYS 225 Physics III [1]	SU class (3 credit) includes lab credit
Engineering Core Requirements: 48 Credits					
ENGE 150 Engineering Design	3	3		ENGR 100 Eng. Design [1]	
ENGE 170 Programming for Eng.	3	3		COSC 120 Computer Science 1 [1]	
ENGE 240 Basic Circuit Theory	3	4		PHYS 311 Electrical Circuits (4 credits) [1]	
ENGE 241 Analog Circ. Lab.	1				
ENGE 250 Digital Logic Design	3		3		
ENGE 251 Digital Logic Lab	1		1		
ENGE 260 Statics	3	3		ENGR 110 Statics [1]	
ENGE 261 Dynamics	3	3		ENGR 221 Dynamics [1]	
ENGE 270 Comp Aided Design	3		3		
ENGE 320 Statistics and Prob.	3		3		
ENGE 340 Electronics	3		3		
ENGE 341 Electronics Lab	1		1		

ENGE 362 Mechanics of Material	3	3		ENGR 220 Mech. of Materials [1]	
ENGE 370 Computational Meth.	3		3		
ENGE 380 Instrumentations	3		3		
ENGE 382 Control Systems	3		3		
ENGE 383 Instr. & Control Lab	1		1		
ENGE 475 Engineering Seminar	1		1		
ENGE 476 Senior Design Project I	2		2		
ENGE 477 Senior Design Project II	2		2		
Engineering Specialization Requirements: 17 Credits					
Specialization Elective[2]	3		3		
Specialization Elective[2]	3		3		
Specialization Elective[2]	3		3		
Specialization Elective[2]	3		3		
Specialization Elective[2]	3		3		
Specialization Elective Lab[2]	2		2		
Total Credits	124	78	46		

[1] Students must earn grades "C" or above.

[2] Engineering Specialization Requirements (Credits 17) Students must take five courses and one lab from one of the following areas of specialization (i.e. Specialization electives):

Aerospace Specialization (ENAE)		**Credits**
ENAE 342	Fluid Mechanics	3
ENAE 442	Micro Electro-Mechanical Systems (MEMS)	3
ENAE 345	Thermodynamics	3
ENAE 462	Digital Control Systems	3
ENAE 389	Space Systems Design	3
ENAE 464	Embedded Systems Design Laboratory	2
ENAE 412	Space Navigation and Guidance	3
ENAE 465	Remote Sensing and Image Processing	3
ENAE 420	Aerodynamics	3
ENAE 467	Design of Autonomous Aerial Systems	3
ENAE 430	Finite Element Analysis	3
ENAE 472	Selected Topics in Engineering	3
ENAE 440	Mechatronics	3

Computer Specialization (ENCE)		**Credits**
ENCE 330	Signals and Systems	3
ENCE 458	VLSI Design	3
ENCE 350	Computer Organization	3
ENCE 422	Introduction to Machine Learning	3

ENCE 460	Digital Signal Processing	3
ENCE 352	Microprocessors and Microcomputers	3
ENCE 372	Computer Networks	3
ENCE 462	Digital Control Systems	3
ENCE 387	Simulation and Virtual Reality	3
ENCE 464	Embedded Systems Design Laboratory	2
ENCE 452	Artificial Intelligence	3
ENCE 468	Robotics	3
ENCE 454	Computer System Architecture	3
ENCE 469	Robotics and Automation Design Laboratory	2
ENCE 456	Microprocessors Design Laboratory	2
ENCE 472	Selected Topics in Engineering	3
ENCE 442	Introduction to Machine Learning	3

Electrical Specialization (ENEE)		**Credits**
ENEE 330	Signals and Systems	3
ENEE 348	Electromagnetic Theory	3
ENEE 372	Computer Networks	3
ENEE 385	Power Electronics	3
ENEE 422	Introduction to Machine Learning	3
ENEE 460	Digital Signal Processing	3
ENEE 465	Remote Sensing and Image Processing	3
ENEE 462	Digital Control Systems	3
ENEE 387	Simulation and Virtual Reality	3
ENEE 464	Embedded Systems Design Laboratory	2
ENEE 443	Communication Systems	3
ENEE 468	Robotics	3
ENEE 454	Computer System Architecture	3
ENEE 469	Robotics and Automation Design Laboratory	2
ENEE 444	Communications Design Laboratory	2
ENEE 472	Selected Topics in Engineering	3
ENEE 442	Introduction to Machine Learning	3

Mechanical Specialization (ENME)		**Credits**
ENME 342	Fluid Mechanics	3
ENME 442	Micro Electro-Mechanical Systems (MEMS)	3
ENME 345	Thermodynamics	3
ENME 462	Digital Control Systems	3
ENME 346	Heat transfer	3
ENME 464	Embedded Systems Design Laboratory	2
ENME 422	Mechanisms and Machine Design	3
ENME 468	Robotics	3
ENME 425	Rapid Prototyping and Product Develop.	3
ENME 469	Robotic and Automation Design Laboratory	2
ENME 430	Finite Element Analysis	3
ENME 472	Selected Topics in Engineering	3
ENME 440	Mechatronics	3

Appendix II: Tentative **nine semester** UMES Engineering program course sequence for SU/UMES Physics/Engineering dual-Degree Program students is as follows (First through third year at SU).

[4];Students in the second semester at third year will take one engineering course at UMES. Years 4 and the fall semester of Year 5 at UMES.

FIRST YEAR (SU)

Fall (15 credit hours)	Spring (15 credit hours)
PHYS 221 (4)	PHYS 223 (4)
MATH 201 (4)	MATH 202 (4)
HIST 101, 102, 103 (4)	ENGL 103 (4)
FTWL 106 (3)	ENGR 100 (3)

SECOND YEAR (SU)

Fall (18 credit hours)	Spring (17-18 credit hours)
PHYSICS 225 (3)	PHYS 313 (3)
MATH 310 (4)	MATH 311 (4)
CHEM 121 (4)	CHEM 122 (4)
HIST xxxx (4)	ENGR 220 (3)
ENGR 110 (3)	Gen Ed IIIB (3-4)

THIRD YEAR (SU/UMES)

Fall (18 credit hours)	Spring (16-17 credit hours)
PHYS 311 (4)	PHYS 314 (3)
PHYS 309 (3)	PHYS 315 (3)
Gen Ed III A (4)	Gen Ed IIIC (3-4)
ENGL xxx (4)	COSC 120 (4)
ENGR 221 (3)	**ENGE 270 (3) UMES Co-enrolled***

FOURTH YEAR (UMES)

Fall (17 credit hours)	Spring (13 credit hours)
ENGE 250 (3)	ENGE 382 (3)
ENGE 251 (1)	ENGE 383 (1)
ENGE 340 (3)	ENGE 475 (1)
ENGE 341 (1)	ENGE 476 (2)
ENGE 370 (3)	Specialization Elective (3)
ENGE 380 (3)	Specialization Elective (3)
Specialization Elective (3)	

FIFTH YEAR (UMES)

Fall (13 credit hours)
ENGE 320 (3)
ENGE 477(2)
Specialization Elective (3)
Specialization Elective (3)

[4] MUST COMPLETE 30 HOURS AT THE 300/400 LEVEL WITH A GRADE OF "C" OR BETTER. NEED 120 TOTAL CREDITS FOR GRADUATION. ***ALL REQUIRED PHYSICS COURSES MUST BE COMPLETED WITH A MINIMUM OVERALL GPA OF 2.0.***

***ENGE 270 is typically scheduled on MWF 3-3:50 PM in the spring semester at UMES.

Specialization Lab (2)

Appendix III

The following SU physics courses are transferrable to UMES's engineering program as specialization courses:

SU Physics Courses[4]	**UMES Engineering Courses**
PHYS 315 Electricity and Magnetism (3 credits)	ENEE 348 Electromagnetic Theory (3 credits)
ENGR 232 Thermodynamics (3 credits)	ENME 345 (or ENAE 345) Thermodynamics (3 credits)
ENGR 331 Fluid Mechanics (3 credits)	ENME 342 (or ENAE 342) Fluid Mechanics (3 credits)

[4] Students must earn grade "C" or above.

Appendix IV

The following courses are considered the "Physics Core" for this agreement.

CHEM 121
CHEH 122
MATH 201[5]
MATH 202
MATH310
MATH 311
PHYS 221[5]
PHYS 223
PHYS 225
PHYS 309
PHYS 311
PHYS 313
PHYS 314
PHYS 315
ENGR 100

[5] For admission into the Dual Degree program between UMES and SU, students must earn a grade of C or better in these courses at SU.