TECHNICAL ELECTIVE GROUPS

Nine credits of technical electives are required to graduate. At least two courses must be selected from the list of approved courses below and they must be taken from a single working group category to satisfy the in-depth requirement. A technical elective waiver form is required if any of the courses are not selected from the list below. This form must be signed by the student=s adviser, the course instructor, and the Department Head or Associate Head prior to registration in the course.

1. **ENERGY and THERMAL SYSTEMS**		**Credits**	**Semester**
MECH 437	Internal Combustion Engines (MECH 344)	3	Fall
MECH 448	Pollution Prevention (CBE 331 or CIVE 300 or MECH 342)	3	Fall
MECH 460	Aeronautics (MECH 342)	3	Spring
MECH 463	Building Energy Systems (MECH 344)	3	Spring
MECH 468	Space Propulsion & Power Engineering (ECE 204, MECH 337, MECH 342)	3	Fall
MECH 507*	Laser Diagnostics for Thermosciences (PH 142)	3	Fall
MECH 551H	Physical Gas Dynamics I (MECH 342)	3	Fall
MECH 552	Applied Computational Fluid Dynamics (MECH 342 or CIVE 300)	3	Fall
MECH 558*	Combustion (MECH 342)	3	Fall
MECH 561*	Space Propulsion & Mission Analysis (MATH 340)	4	Spring
MECH 567H	Broad-Beam Ion Sources (MATH 340)	3	Spring
MECH 575	Solar and Alternative Energies (MECH 337, 342 and 344)	3	Fall
PH 451	Introductory Quantum Mechanics I (MATH 340, PH 314)	3	Fall
PH 452	Introductory Quantum Mechanics II (PH 451)	3	Spring

2. **INTEGRATED SYSTEMS**			
CSCC 150	Interactive Programming with JAVA	4	Fall, Spring
or			
CSCC 160	Foundations in Programming (MATH 118)	4	Fall, Spring, Summer
or			
CS 155	Introduction to Unix (prereq. none)	1	Fall, Spring, Summer
CS 156	Introduction to C Programming I (CS 155, MATH 118)	1	Fall, Spring, Summer
CS 157	Introduction to C Programming II (CS 156, MATH 118)	1	Fall, Spring
MECH 411	Manufacturing Engineering (CIVE 360, MECH 331)	3	Spring
MECH 509	Manufacturing Quality Design and Control (MATH 340, STAT 315)	3	Spring
MECH 510	Advanced Engineering Economy (MECH 410, STAT 315)	2	Summer
MECH 512	Reliability Engineering (MECH 513, STAT 315)	3	Spring
MECH 513	Simulation Fundamentals (STAT 315)	3	Fall
MECH 514H	Manufacturing & Robotic Systems (MECH 417)	3	Spring

Course(s) within parenthesis indicate prerequisite(s) * Offered even years H Offered odd years

3. MECHANICS & MATERIALS (To use two courses from this working group to satisfy the in-depth requirement, both courses must be selected from the same category below (e.g., Cat. 3.1, Cat. 3.2 or Cat. 3.3)

Cat. 3.1:

MECH 411	Manufacturing Engineering (CIVE 360, MECH 331)	3	Spring
MECH 431	Metals and Alloys (MECH 331)	3	Fall
MECH 530	Advanced Composite Materials (CIVE 360, MECH 331)	3	Fall
MECH 531	Materials Engineering (MECH 331 or MECH 431)	3	Spring
MECH/BIOM 532	Materials Issues in Mechanical Design (MECH 331)	3	Fall

Cat. 3.2:

BMS 300	Principles of Human Anatomy and Physiology (LIFE 102 or BZ 101 or BZ 110; CHEM 103 or CHEM 107 or CHEM 111)	4	Fall, Spring, Summer
BIOM 470	Biomedical Engineering (PHCC 141 and MATH 155 or MATH 160)	3	Fall
or			
MECH/BIOM 570	Bioengineering (MECH 307, MECH 324)	3	Fall
MECH/BIOM 571	Biomechanics (BIOM 470 or MECH/BIOM 570)	3	Spring
MECH/BIOM 573	Structure and Function of Biomaterials (MECH 331)	3	Spring

Cat. 3.3:

CIVE 560	Advanced Mechanics of Materials (CIVE 360)	3	Fall
CIVE 566	Intermediate Structural Analysis (CIVE 367)	3	Fall

4. DYNAMIC SYSTEMS

CSCC 150	Interactive Programming with JAVA (prereq. none)	4	Fall, Spring
or			
CSCC 160	Foundations in Programming (MATH 118)	4	Fall, Spring, Summer
or			
CS 155	Introduction to Unix (prereq. none)	1	Fall, Spring, Summer
CS 156	Introduction to C Programming I (prereq. CS 155, MATH 118)	1	Fall, Spring, Summer
CS 157	Introduction to C Programming II (prereq. CS 156, MATH 118)	1	Fall, Spring
MATH 369	Linear Algebra (MATH 161, MATH 229)	3	Fall, Spring, Summer
MATH 531	Discrete Models of Physical Systems (MATH 340 or MATH 345)	3	Fall
MECH 417	Control Systems (MATH 340, MECH 302)	3	Fall
or			
ECE 411	Control Systems (ECE 312)	4	Fall
MECH 524	Principles of Dynamics (MECH 324)	3	Fall
MECH 526	Vehicle Dynamics (MECH 324)	4	Spring
MECH 529H	Advanced Mechanical Systems (MECH 307)	3	Spring
MECH 564*	Fund. of Robot Mechanics & Controls (MECH 417)	3	Spring
CIVE 562	Fundamentals of Vibrations (CIVE 261, CIVE 360)	3	Spring

Course(s) within parenthesis indicate prerequisite(s) *Offered even years H Offered odd years