UNDERGRADUATE AND PROFESSIONAL MAJOR CHANGE BULLETIN NO. 7
Spring 2015

Faculty Senate Approved February 12, 2015

---REQUIREMENTS---

The requirements listed below reflect the undergraduate major curricular changes approved by the Catalog Subcommittee since approval of the last Undergraduate Major Change Bulletin. All changes are underlined. Deletions are crossed out. The column to the far right indicates the date each change becomes effective.

Dept	Proposed	Effective Date
Business New minor in Entrepreneurship	**Entrepreneurship** To be eligible to certify for an Entrepreneurship minor, students must be certified in a major and have a cumulative GPA of 2.5 or higher. Completion of the minor requires 18 credits of course work including ACCTG 230 and ENTRP 426. Additional requirements include one management course (ENTRP 489 or ENG 401), one Marketing/Communication course (ENTRP 490 or COMSTRAT 380), and 2 Business plan courses (6 credits) over two semesters (ENTRP 485/486, ENTRP 496/496, or BIO ENG 410/411). Nine of the 18 credits must be taken in residence at WSU or through WSU-approved education abroad or educational exchange course. Application for the minor must be competed online at www.business.wsu.edu/advising	**8-15**
Civil and Environmental Engineering	**Civil Engineering (127 Hours)** At least 50 of the total hours required for this degree must be in 300-400-level courses. None of the courses listed below may be taken on a pass, fail basis and a grade of C or better in all CE courses <u>used to fulfill major requirements</u> is required for graduation. Certification Requirements: Students who will be completing at least 45 semester hours of course work at the end of the semester including CE 211, MATH 171, 172, and PHYSICS 201 or equivalents are eligible to apply for certification into the Department of Civil and Environmental Engineering. The number of students certified into the department depends upon the available resources and facilities. The best qualified students, based on cumulative GPA and grades in the prerequisite courses listed above, as well as all math-, science and engineering courses taken to date, will be certified into the department until the carrying capacity is reached. Experiential Requirement Students within the Department of Civil and Environmental Engineering must complete one of the following experiential requirements:	**8-15**

1. An internship of at least eight weeks duration, with at least one credit of CE 495.
2. A research position of at least eight weeks duration under the supervision of a departmental faculty member or approved mentor, with at least one credit of CE 499.
3. Study abroad for six or more credit hours. International students in the Department of Civil and Environmental Engineering will meet this requirement through their study in the United States.
4. Participation in a recognized ROTC program. Veterans in the Department of Civil and Environmental Engineering will have met this requirement through their prior service in the armed forces.
5. A leadership or service experience of at least one semester, subject to departmental approval, with at least one credit of CE 499.

First Year

First Term	*Hours*
CHEM 105 [PSCI]	4
Creative & Professional Arts [ARTS]	3
ENGLISH 101 [WRTG]	3
ENGR 120	2
~~HISTORY 105 [ROOT]~~	3
MATH 171 [QUAN][1]	4

Second Term	*Hours*
BIOLOGY 102 [BSCI] or MBIOS 101 [BSCI]	4
~~Creative & Professional Arts [ARTS]~~	3
ECONS 101 [SSCI] or 102 [SSCI]	3
HISTORY 105 [ROOT]	3
MATH 172[1]	4
MATH 220	2

Second Year

First Term	*Hours*
CE 211[1]	3
COM 102 [COMM] or H D 205 [COMM]	3
Diversity [DIVR]	3
MATH 273	2
PHYSICS 201 [PSCI][1]	4

Second Term	*Hours*
C E 215	3
CHEM 106, GEOLOGY 102, or PHYSICS 202[2]	4
E E 221	2
MATH 360 or 370	3

ME 212	3
ME 220	1
Complete Writing Portfolio	

Third Year

First Term	*Hours*
CE 302	2
CE 315	3
CE 317 [M]	3
~~CE 330~~	~~3~~
CE ~~341~~Breadth Electives[3]	~~3~~6
CST M 254	2

Second Term	*Hours*
CE 303	2
~~CE 322~~	~~3~~
CE ~~351~~Breadth Elective[3]	~~3~~6
E E 304 or ME 301	2
ENGLISH 402	3
MATH 315	3

Fourth Year

First Term	*Hours*
CE 463	3
CE 480 [M]	1
CE Electives[4]	9
CE Laboratory[4]	3

Second Term	*Hours*
CE 465 [M] ~~or Integrative Capstone~~ [CAPS][~~4~~5]	3
CE 466	1
CE Elective[4]	9
Humanities [HUM]	3
Fundamentals of Engineering Exam	

Footnotes

[1] Classes that must be completed prior to certification.

[2] CHEM 106 strongly recommended for ~~an Environmental and Infrastructure Engineering emphasis~~ students emphasizing environmental engineering; GEOL<u>OGY</u> 102 strongly recommended for ~~a Structural Engineering emphasis.~~ <u>students emphasizing structural, geotechnical, or infrastructure engineering.</u>

[3] <u>Choose three courses from CE 322, 330, 341 and 351 and one other upper-division CE elective.</u>

[~~3~~4] Elective courses: The total credit hours for elective courses must be distributed such that at

	least three courses, not including the lab, are ~~DES (design emphasis) in order for a student to qualify for a degree~~ designated as having design emphasis. Those design courses must be selected such that at least one is chosen from two different areas of study, which include Environmental (CE 403, 419, and 442); Geotechnical (CE 425 and 435); Hydraulics (CE 450, 456, 460, and 475); Structural (CE 431, 433, 434, and 436); Sustainability (CE 405 and 456); and Transportation/Pavement (CE 473); or as approved by advisor. ~~CE electives including CE laboratory will be selected such that at least one designated as DES should be chosen from two different areas (environmental, geotechnical, hydraulics, structural, and transportation/pavement).~~ ~~4~~5 Course to be taken in final semester.	
Digital Technology and Culture	**Digital Technology and Culture (120 Hours)** DTC Certification Requirements, Pullman Campus Certification can take place at any point during the semester. To apply for certification a student must have the following: 24 completed hours; a minimum 2.2 ~~gpa~~ GPA; a sample digital text in web authoring, animation, video production, and/or graphic design; and a written statement of purpose (approximately 500-750 words) explaining how the DTC major supports the student's career goals. This statement should also describe how the sample digital text was produced and justify the text's overall design choices. Certification applications will be reviewed by a committee that includes the DTC Director, Assistant Director, and one DTC instructor or a graduate student teaching DTC courses. Transfer students with 55 or more hours should complete the certification requirements within two semesters. All students should certify before earning 90 hours. No DTC course (DTC 355, 356, 375, 475, and FINE ART 331) may be taken on a pass/fail basis. **First Year**	**8-15**

First Year

First Term	*Hours*
Creative & Professional Arts [ARTS]	3
ENGLISH 101 [WRTG]	3
~~HISTORY 105 [ROOT]~~	3
Humanities [HUM]	3
Quantitative Reasoning [QUAN]	3
Foreign Language or Electives	3-4

Second Term	*Hours*
Biological Sciences [BSCI] with lab or SCIENCE 101 [SCI]	4
Communication [COMM] or Written Communication [WRTG]	3
~~Creative & Professional Arts [ARTS]~~	3
HISTORY 105 [ROOT]	3
FINE ART 102[1]	3
Foreign Language or Electives	3-4

Second Year

First Term	*Hours*
Creative & Professional Arts [ARTS], Humanities [HUM], or Social Sciences [SSCI]	3
~~DTC 355 [M]~~	~~3~~
Social Sciences [SSCI]	3
Electives	~~6~~9

Second Term	*Hours*
DTC 356	3
~~DTC 375~~	~~3~~
<u>DTC Concentration Elective[2]</u>	<u>3</u>
Physical Sciences [PSCI] with lab or SCIENCE 102 [SCI]	4
Electives	4
Complete Writing Portfolio	

Third Year

First Term	*Hours*
<u>DTC 355 [M]</u>	<u>3</u>
<u>DTC 375 [M]</u>	<u>3</u>
~~DTC Concentration Elective[2]~~	~~3~~
DTC Core Option[2-3]	3
FINE ART 331	3
Electives	~~6~~<u>3</u>

Second Term	*Hours*
Diversity [DIVR]	3
DTC 475	3
DTC Concentration Elective[2]	3
DTC Core Option[2-3]	3
Elective	3

Fourth Year

First Term	*Hours*
DTC Concentration <u>Elective</u>[2]	6
<u>DTC Core Option[2-3]</u>	<u>3</u>
Integrated Capstone [CAPS]	3
Electives	~~6~~<u>3</u>

Second Term	*Hours*
Senior Seminar, Thesis, or Internship	3

	Electives 12	
	Footnotes [1] Prerequisite to FINE ART 331. [2] ~~Consult with an advisor for a list of approved 300-400 level courses.~~ Approved Concentration Electives include: ANTH 330, 350; CPT S 322 [M], 355, 401, 442, 443 [M]; DTC 335, 336, 338, 354, 476, 477, 478; ENGLISH 300, 301, 336, 337, 354, 357, 360, 361, 401, 402 [M], 405, 458, 476, 477, 478; FINE ART 332, 333, 337, 363, 380, 433, 434, 435; FOR LANG 304 [M], 350; HISTORY 300 [M]; HUMANITY 304; MIS 322 [M], 325, 372 [M], 374, 441; POL S 317; PSYCH 492; SOC 373, and 430. [3] Approved Core Options include: ANTH 350; CPT S 401; DTC 354; ENGLISH 301, 402 [M]; FINE ART 332, 333; FOR LANG 350; and SOC 373.	
Educational Leadership, Sport Studies, and Educational/Counseling Psychology Revise graduation requirements for Bachelor of Science in Athletic Training.	## Athletic Training (~~126~~ **121** Hours) The athletic training education program is currently accredited by the Commission on Accreditation of Athletic Training Education (CAATE). The athletic training major is designed to provide students with the necessary academic and clinical competencies required to be eligible for certification by the Board of Certification. All students majoring in athletic training will complete the kinesiology core, the athletic training major course work and a minimum of 1200 hours of clinical experience. Due to the intensity and availability of the clinical internship, the program admits a limited number of students. Acceptance into the athletic training ~~education~~ program (ATEP) is required to certify athletic training as a major and to complete the degree requirements for graduation. Academic requirements for this application process include but are not limited to 1) a grade of C or better in KINES 262, KINES 266, KINES 267 and KINES 263; 2) a minimum cumulative collegiate GPA of 2.75 or better including the current semester; and 3) current credentialing in CPR/AED for the ~~Professional Rescuer~~ Healthcare Provider. Students are advised to consult with athletic training advisors early in their academic careers for specific application procedures. Transfer students are welcome to apply for admission into the clinical internship prior to their attendance at WSU. Transfer students desiring admission into the clinical internship program must have been accepted to WSU, have completed the prerequisite course work, and meet academic requirements ~~and be of sophomore standing~~. Applicants who do not meet the required 2.75 cumulative GPA requirement but have had a semester 2.75 GPA the last two semesters at WSU may complete the application process and be provisionally admitted into the ATEP. Transfer students will also have to show one spring semester at WSU with a 2.75 GPA to be eligible. Clinical internship experiences combine the theory and management of sport-related injury/illness under the direct supervision of certified athletic trainers. The clinical experience is guided by progressive clinical competencies and technical standards that assess the student's progress. A minimum of 1200 hands-on	**8-15**

clinical experience hours are arranged over six consecutive semesters with a parallel educational cooperative partnership involving the Department of Intercollegiate Athletics and several off-campus sites including clinical experiences at high school and sport medicine facilities. Students are expected to maintain high academic standards and demonstrate progressive clinical competence to remain a part of the AT~~E~~P. Please refer to the AT~~E~~P Handbook for additional policies and procedures governing the program experience.

Kinesiology Core courses required for athletic training, health and fitness teaching, and ~~movement studies~~ sport science include: KINES 199, 262, 264, 311, 361, ~~362,~~ 380, 461, 462, 484, BIOLOGY 251.

First Year

First Term	*Hours*
BIOLOGY 102 [BSCI] or 106 [BSCI]	4
HISTORY 105 [ROOT]	3
KINES 199	3
~~KINES 262~~	4
KINES 267	~~2~~3
~~PSYCH 105 [SSCI]~~	3
STATS 212 [QUAN]	4

Second Term	*Hours*
~~BIOLOGY 102 [BSCI] or 106 [BSCI]~~	4
ENGLISH 101 [WRTG]	3
KINES 262	4
KINES 263	2
KINES 264	3
KINES 266	3
~~KINES 267~~	~~2~~

Apply to Clinical Internship

Second Year

First Term	*Hours*
BIOLOGY 140	3
CHEM 101 [PSCI] or 105 [PSCI]	4
~~COM 102 [COMM]~~	3
~~ENGLISH 101 [WRTG]~~	3
KINES 270	3
KINES 291	2
PSYCH 105 [SSCI]	3

Second Term	*Hours*
~~BIOLOGY 140~~	~~4~~
COM 102 [COMM]	3
KINES 271	3
KINES 275	3
KINES 291	~~3~~2
KINES 311	3
KINES 361	3
Complete Writing Portfolio	

Third Year

First Term	*Hours*
BIOLOGY 251	4
KINES 305	3
~~KINES 364~~	~~3~~
KINES 365	3
KINES 392	~~3~~2
KINES 462	3

Second Term	*Hours*
Creative & Professional Arts [ARTS]	3
~~KINES 312 [M]~~	~~3~~
~~KINES 361~~	~~3~~
KINES 364	3
~~KINES 365~~	~~3~~
KINES 380	3
KINES 392	2
KINES 470	3
~~SOC 101 [SSCI]~~	~~3~~

Fourth Year

First Term	*Hours*
~~Creative & Professional Arts [ARTS]~~	~~3~~
Humanities [HUM]	3
KINES 313	3
KINES 469 [M]	3
KINES 493	2
KINES Elective	3
~~PSYCH 265~~	~~3~~

Second Term	*Hours*

	Diversity [DIVR] 3	
	~~Integrative Capstone [CAPS]~~ 3	
	KINES 461 [M] 3	
	KINES 484 [CAPS] 3	
	KINES 493 2	
	KINES Elective 3	
Educational Leadership, Sport Studies, and Educational/Counseling Psychology Revise certification requirements and graduation requirements for Bachelor of Science in Kinesiology – Sport Science plan.	**Sport Science (120 Hours)** The Sport Science major leads to the Bachelor of Science in Kinesiology. The major provides an interdisciplinary understanding of human movement through the study of anatomy, physiology, movement analysis, biomechanics, motor learning, exercise physiology, and sport psychology and ethics. In addition, students gain proficiency in four of five sport activity areas. ~~Movement studies~~ Sport Science provides a foundation for personal training certification, health and fitness club employment, teaching, coaching, physical therapy, dance therapy, and sports medicine. Because of the high demand for this program, students must meet minimum certification requirements, as listed below, in order to be admitted to the ~~Movement Studies~~ Sport Science program. Applicants who meet the minimum requirements are eligible for consideration, but not assured admission. Enrollment is limited and admission competitive. Admission application dates are ~~October 15, March 15, and August 5~~ September 1st to 30th and February 1st to 28th, with certification effective the following term. Candidates must complete formal admission procedures and be certified in the Sport~~s~~ Science major prior to taking any 300- or 400-level courses. The following minimum criteria must be met for consideration for admission: Minimum Criteria 1. Completion of at least 24 ~~30~~ semester hours of coursework. 2. A cumulative ~~gpa~~ GPA of 2.75. 3. A grade of C or better in each of the following courses: KINES 199 and KINES 262 ~~COM 102, ENGLISH 101, and MATH [QUAN] UCORE~~. 4. A written statement (maximum of two pages) describing relevant work experience/involvement in extracurricular activities related to Sport Science. This statement will be evaluated on the basis of the breadth and depth of the experiences, as well as for clarity of expression. **First Year** *First Term* *Hours*	**8-15**

Course	Hours
ENGLISH 101 [WRTG]	3
~~HISTORY 105 [ROOT]~~	~~3~~
<u>Humanities [HUM]</u>	<u>3</u>
KINES 138	1
KINES 199	3
PSYCH 105 [SSCI]	3
Elective Core[1]	3
Second Term	*Hours*
BIOLOGY 140 [BSCI]	3
<u>HISTORY 105 [ROOT]</u>	<u>3</u>
KINES 262	4
KINES 264	3
~~SOC 101~~	~~3~~
<u>STATS 212 [QUAN]</u>	<u>4</u>
~~Elective Core~~	~~3~~
Second Year	
First Term	*Hours*
BIOLOGY 102 or 106	4
H D course[2]	3
KINES 266	3
SOC 245	3
<u>Elective Core</u>[1]	<u>3</u>
~~STATS 212 [QUAN]~~	4
Second Term	*Hours*
CHEM 101 [PSCI] or 105 [PSCI]	4
COM 102 [COMM]	3
<u>Creative & Professional Arts [ARTS]</u>	<u>3</u>
H D course[2]	3
~~KINES 361~~	~~3~~
Elective Core[1]	3
Third Year	
First Term	*Hours*
BIOL 251	4
~~Creative & Professional Arts [ARTS]~~	~~3~~
KINES 311	3
KINES 312<u>[M]</u>	3
<u>KINES 361</u>	<u>3</u>
KINES 462	3
Complete Writing Portfolio	
Second Term	*Hours*

	Diversity [DIVR]	3	
	~~Humanities [HUM]~~	~~3~~	
	KINES 313	3	
	KINES 314	3	
	KINES 380	3	
	KINES 390	1	
	<u>Elective</u>	<u>2</u>	
	Fourth Year		
	First Term	*Hours*	
	Integrative Capstone [CAPS]	3	
	KINES 415	3	
	KINES 461<u>[M]</u>	3	
	KINES 484	3	
	Elective Core[1]	2-4	
	Second Term	*Hours*	
	KINES 485	10-12	

Footnotes

[1] <u>Four courses required: Choose from BIOL 107, CHEM 102, CHEM 106, KINES 267, 305, 490, 499, PSYCH 230, 333, 361, 470, PHYS 101, 102, or as approved by advisor.</u>

[2] <u>HD courses can be chosen from H D 101, 201, 202 or 203.</u>

| **Educational Leadership, Sport Studies, and Educational/Counseling Psychology** Revise requirements for minor in Strength and Conditioning | **Strength and Conditioning**

The minor in strength and conditioning requires 22 semester hours of course work and practical experience. The minor is designed for students with an interest in pursuing a profession as <u>a</u> strength and conditioning coach, personal trainer, coach<u>,</u> or athletic trainer. To be eligible to certify as a strength and conditioning minor, a student must have earned at least 60 credit hours, have a minimum cumulative ~~gpa~~<u>GPA</u> of at least 2.75 and be certified in a major. Graded courses in the minor may not be taken pass/fail. Admission <u>is competitive and requires an application process.</u> ~~to the major~~ The minor requires KINES 262, 264<u>,</u> and 311 as prerequisites coursework<u>.</u> ~~along with an interview.~~ Required courses include KINES ~~262, 264,~~ <u>305,</u> ~~311~~<u>, 380, 411, and 462. In addition, students will have vocational practicum experiences with KINES 412, 413</u>, and 414~~.~~ <u>under the supervision of approved strength and conditioning experts. Each practicum is 120-150 hours per term, with a required total of 400 hours for the completion of the minor.</u> ~~Recommended courses for the minor include KINES 266 and 305.~~ <u>Credit hours for the minor must include 9 hours of upper-division work taken in residence at WSU or through WSU-approved education abroad or educational exchanges courses.</u> | **8-15** | |

Educational Leadership, Sport Studies, and Educational/Counseling Psychology Revise requirements for minor in Sport Management	**Sport Management** The minor in sport management requires 18 semester hours of course work ~~and practical experience~~. The minor is designed for students with an interest in sport organizations or sport-related business. Sport management is an appropriate area for students with a variety of career interests, including business, communication, law, and social sciences. To be eligible to certify as a sport management minor a student must have earned at least 60 credit hours, have a minimum cumulative ~~gpa~~GPA of at least 2.5 and be certified in a major. Graded courses in the minor may not be taken pass/fail. The program director must approve any exceptions to these requirements. ~~Required courses include SPMGT 276, 290, 365, and 377; and 6 hours from SPMGT 367 or SOC 245, SPMGT 394, 496, 497, 498.~~ Required courses include SPMGT 276 and 290; and 12 hours from SPMGT 367 or SOC 245, SPMGT 365, 374, 377, 394, 464, 468, 496, 497. Credit hours for the minor must include 9 hours of upper-division work taken in residence at WSU or through WSU-approved education abroad or educational exchange courses.	**8-15**
Electrical Engineering and Computer Science Revise graduation requirements for Bachelor of Science in Computer Science	**Bachelor of Science, Computer Science Requirements (120 Hours)** Students may apply for certification into the Bachelor of Science in Computer Science degree program after completion of the following courses with a grade of C or better and a cumulative GPA of 2.5 or higher: CPT S 121, 122, 223; MATH 171, 172, 216; PHIL 201; PHYSICS 201. No courses listed in this schedule of study may be taken on a pass/fail basis. All listed E E and CPT S courses, required electives, and prerequisites to these courses must be completed with a grade of C or better. **First Year**	**8-15**

First Year (continued)

First Term	*Hours*
CPT S 121	4
ENGLISH 101 [WRTG]	3
MATH 171 [QUAN]	4
PHIL 201	3

Second Term	*Hours*
CPT S 122	4
HISTORY 105 [ROOT]	3
MATH 172	4
MATH 216	3

Second Year

First Term	*Hours*
CPT S 223	3
~~CPT S 224~~	~~2~~
CPT S 260	3
MATH 220	2
MATH 273 or 301	2 or 3
PHYSICS 201 [PSCI]	4

Second Term	*Hours*
~~Biological Sciences [BSCI]~~	~~3 or 4~~
CPT S 355	3
Creative & Professional Arts [ARTS]	3
Humanities [HUM]	3
~~MATH 220~~	~~2~~
PHYSICS 202	4
Social Sciences [SSCI][1]	3
Complete Writing Portfolio	

Third Year

First Term	*Hours*
CPT S 317	3
CPT S 322 [M]	3
~~CPT S 355~~	~~3~~
CPT S 360	4
ENGLISH 402 [WRTG] [M]	3
~~Humanities [HUM]~~	~~3~~
STAT 360	3

Second Term	*Hours*
CPT S 302	3
~~CPT S 317~~	~~3~~
~~CPT S 323~~	~~3~~
CPT S 350	3
~~CPT S 360~~	~~4~~
~~CPT S Option Courses[2]~~	~~6~~
CPT S Track Elective[2]	6
Diversity [DIVR]	3

Fourth Year

First Term	*Hours*
Biological Science with Lab [BSCI]	4
CPT S 421	3
~~CPT S 422 [M]~~	~~3~~
~~CPT S 450~~	~~3~~
~~CPT S Option Courses[2]~~	~~6~~
CPT S Track Elective[2]	3
CPT S Free Elective[3]	6
~~Diversity [DIVR]~~	~~3~~

Second Term	*Hours*
~~CPT S 302~~	~~3~~
CPT S 423 [CAPS]	3
~~CPT S 460~~	~~3~~
~~CPT S Option Course[2]~~	~~3~~
CPT S Track Elective[2]	6
CPT S Free Elective[3]	6
~~Electives~~	~~2~~
Complete Cpt S Exit Interview and Survey	

Footnotes

[1] ECONS 101 or 102 recommended.

[2] Tracks consist of five courses (15 credits): **General Track:** Required: CPT S 323 and 460; at least one course from CPT S 440, 443, and 471; at least two courses from CPT S 427, 451, 452, and 455. **Software Engineering Track:** Required: CPT S 323 and 422; at least three courses from CPT S 427, 443, 451, 452, 460, 480, 481, and 483 (with departmental approval). **Systems and Networking Track:** Required: CPT S 455 and 460; at least three courses from CPT S 427, 452, 453, 464, 466, 483 (with departmental approval), and E E 324.

[2] ~~Fifteen credits (5 courses) of option area classes are required for completion of the degree program. The option courses are chosen from upper-level computer science related courses and must be approved by an advisor. BS Computer Science Option courses can be chosen from the following list of classes: CE 463, CPT S 425, CPT S 427, CPT S 430, CPT S 434, CPT S 438, CPT S 440, CPT S 442, CPT S 443, CPT S 451, CPT S 452, CPT S 453, CPT S 455, CPT S 456, CPT S 464, CPT S 466, CPT S 470, CPT S 481, CPT S 483, CPT S 490, CPT S 499, DTC 335, MATH 401, MATH 402, MATH 415, MATH 420, MATH 421, MATH 440, MATH 441. NOTE: Upper-division courses in other disciplines may be used with permission. Contact your advisor if you are interested in taking a course that is not included on this list.~~

[3] Four additional courses (12 credits) of 300- or 400-level courses in CPT S and E E courses not used as Track Electives; CE 463; EM 464; MATH 401, 420, 421; MBIOS 478; MSE 302; PHYS 303, and 443.