



UNIVERSITY
of HAWAII
MĀNOA

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MANOA VICE CHANCELLOR'S
OFFICE

January 31, 2019

MEMORANDUM

TO: Michael Bruno
Provost

CC: Krystyna Aune
Graduate Dean

Julienne Maeda
Associate Graduate Dean

Ron Riggs
Interim Dean, College of Engineering

Wayne Shiroma
Department Chair, Department of Electrical Engineering

FROM: Gurdal Arslan
Graduate Chair, Department of Electrical Engineering

SUBJECT: EE Combined BS-MS Degree Application

SPECIFIC ACTION REQUESTED:

It is requested that the Vice Chancellor for Academic Affairs approve the combined pathways for Bachelor of Science and Master of Science in Electrical Engineering.

RECOMMENDED EFFECTIVE DATE:

Fall 2019 semester.

ADDITIONAL COST:

No additional cost.

PURPOSE:

- To allow the qualified students to receive a combined Bachelor of Science and Master of Science degree in Electrical Engineering in five years

FEB -7 2019

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- To attract and retain highly motivated students who are interested in the EE graduate program
- To increase the number of MS enrollments in the EE graduate program and to decrease the average time-to-degree for the EE-MS program

PROPOSED PROGRAM:

As indicated in the catalog, existing BS and MS programs in EE have three major tracks of specialization: computers, electro-physics and systems (except that the computers track at the undergraduate program level corresponds to the Computer Engineering program). Accordingly, both the gateway courses to enter the combined pathways and the courses that can be double-counted are separately listed for each track. The students must pass the gateway courses with a minimum grade of B+ in order to be considered for the pathway.

Computers Track:

Gateway Course: EE 361

Double-Counted Courses:

1. EE 468, and
2. EE 602 or EE 660, and
3. EE 607 or EE 609

Electro-physics Track: BMEP

Gateway Course: EE 371

Double-Counted Courses:

1. EE 438 or EE 480, and
2. EE 671 or EE 624, and
3. EE 681 or EE 682

Systems Track:

Gateway Course: EE 315

Double-Counted Courses:

1. EE 417 or EE 445, and
2. EE 640 or EE 650
3. EE 615 or EE 617


ACTION RECOMMENDED:

It is recommended that the Vice Chancellor for Academic Affairs approve the combined pathways for Bachelor of Science and Master of Science in Electrical Engineering.

Attachments:

1. EE BS and MS Checksheets for Computers Track
2. EE BS and MS Checksheets for Electro-physics Track
3. EE BS and MS Checksheets for Systems Track

Approved // Disapproved:



Michael Bruno
Provost



Date

CURRICULUM CHECK SHEET for CENG-BS + EE-MS (August 2019)

The program of courses listed below satisfies the ABET accreditation criteria of 32 credits of mathematics and basic sciences, and 48 credits of engineering sciences and engineering design. Any deviations must be approved by the student's advisor, department chair, and dean. The University General Education Core and graduation requirements for Engineering are included.

ALL COURSES MUST BE TAKEN FOR LETTER (A-F) GRADES

FRESHMAN

SOPHOMORE

Eng 100 (FW)	3	EE 160	4	EE 211	4	EE 213	4
Math 241 (FQ)	4	Math 242	4	EE 260	4	EE 205	3
Chem 161 (DP)	3	Phys 170 (DP)	4	Math 243	3	Math 244	3
Chem 161L (DY)	1	Phys 170L (DY)	1	Phys 272 (DP)	3	Phys 274	3
FG	3	Chem 162 (DP)	3	Phys 272L (DY)	1	FG	3
H Focus (1)		E Focus (1)		O Focus (1)		W Focus (5)	

UPPER DIVISION

EE 324	3	EE 315	3	EE 342	3	EE 496	3	
EE 371	3	EE 323	3	EE 467 or ICS 314	3	Econ 120, 130 or 131 (DS)	3	
EE 361 Gateway (B+)	3	EE 323L	1	EE 468 (B)	3	EE 602 or EE 660 (B)	3	
EE 361L	1	EE 367	3	Double Counted		TE Double Counted		
EE 362	3	EE 367L	1	DH or DL	3	EE 607 or EE 609 (B)	3	
Math 307	3	EE 396	2	COMG 251 (DA)	3	TE Double Counted		
		TE	3	EE 495	1	DS	3	
							TOTAL BS CREDIT	123

Technical Electives (TE) may be EE courses 300 or above, or ICS courses listed below.

ICS 313, 321, 351, 355, 414, 415, 421, 423, 424, 425, 431, 432, 441, 442, 451, 455, 461, 464, 465, 466, 469, 481.

UNDERGRADUATE PROGRAM NOTES

- Refer to General Education Core Requirements in UHM Catalog for Diversification (DH, DL, DS) and Foundation (FG) Courses.
- Math 251A/252A/253A may substitute for Math 241-244
- Chem 181/181L or Chem 171/171L may substitute for Chem 161/161L and Chem 162.
- ICS 111/211/212 may substitute for EE 160/205.
- ICS 141/241 may substitute for EE 362.
- ICS 311 may substitute for EE 367/367L.
- Writing Intensive (W) required - 5 courses (minimum of 2 in upper division).
- One course each required for Hawaiian, Asian & Pacific Issues (H), Oral Communication (O) and Contemporary Ethical Issues (E).
- Enrollment in EE courses requires a grade of 'C' or better in all prerequisite courses.
- TE may be substituted with an Engineering Breath (EB) course, which is satisfied by a CEE, ME, OE or BE course at the 300-level or higher, CEE 270; or a physical, biological, or computer science course at the 300-level or higher and approved by the Department's Undergraduate Curriculum Committee.
- ENGR 196/296/396 may substitute for EE 196/296/396.

GRADUATE LEVEL

Major EE 600 Cat 1	3	Outside Major EE 400+	3	Plan B: Elective 400+	3	Plan A: EE 700	9
Major EE 600 Cat 2	3	Outside Major EE 400+	3	Plan B: EE 699	3	Seminar Attendance (12)	
				Plan B: EE 699	3	Final Exam	
Plan A: Form I		Plan A: Form II		Plan A: Form III		Plan A: Form IV	
Plan B: Final Exam Form						TOTAL BS+MS CREDIT	153

GRADUATE PROGRAM NOTES

- At most 3 credits of 400-level courses are allowed in graduate level.
- Plan A: 1 credit of EE 700 must be registered during the semester of graduation.
- Plan A: Students can petition to convert their EE 699 credits to EE 700 credits.
- Plan B: Elective 400+ from Engr., Natural Sci., SOEST, Business, or by approval.
- Plan B: 6 credits of EE 699 can be substituted by 6 credits in 600-level courses in EE.
- More rigorous courses from the other programs may be used to satisfy major track or breadth requirements subject to prior approval from the graduate chair.
- Relevant courses from the other programs may be used to satisfy elective course requirements subject to prior approval from the graduate chair.
- Only one out of multiple courses with significantly overlapping contents (for example, cross-listed courses) can be used to satisfy any course requirement.
- Only the courses with a grade of B or better (not B-minus) can count towards the course requirements.

MAJOR TRACKS

	Systems	Category I	Category II
Graduate		EE 615, 618, 640, 644, 650	EE 616, 617, 641, 642, 643, 645, 646, 648, 649, 693D, 693H
Electro-Physics		Category I and II (lumped)	
Graduate		EE 620, 621, 622, 624, 626, 627, 628, 671, 673	EE 675, 680, 681, 682, 685, 693C, 693I, 693J
Computer		Category I	Category II
Graduate		EE 602, EE 660	EE 604, 606, 607, 608, 609, 644, EE 665, 668, 693B, 693E, 693F, ICS 612, 613, 632, 651

APPROVAL FOR GRADUATION: Initial: _____ Date: _____

CURRICULUM CHECK SHEET for EE-BAM Electrophysics Track (August 2019)

The program of courses listed below satisfies the ABET accreditation criteria of 32 credits of mathematics and basic sciences, and 48 credits of engineering sciences and engineering design. Any deviations must be approved by the student's advisor, department chair, and dean. The University General Education Core and graduation requirements for Engineering are included.

ALL COURSES MUST BE TAKEN FOR LETTER (A-F) GRADES

FRESHMAN

SOPHOMORE

Eng 100 (FW)	3	EE 110 or EE 160	3/4	EE 211	4	EE 213	4
Math 241 (FQ)	4	Math 242	4	EE 260	4	Math 244	3
Chem 161 (DP)	3	Phys 170 (DP)	4	Math 243	3	Phys 274	3
Chem 161L (DY)	1	Phys 170L (DY)	1	Phys 272 (DP)	3	EE 296	1
FG	3	Chem 162 (DP)	3	Phys 272L (DY)	1	COMG 251 (DA)	3
						FG	3
H Focus (1)		E Focus (1)		O Focus (1)		W Focus (5)	

UPPER DIVISION

EE 315	3	EE 323	3	EE 624 or EE 671 (B)	3	EE 496	3
EE 324	3	EE 323L	1	Major Double Counted		Econ 120, 130 or 131 (DS)	3
EE 371 Gateway (B+)	3	EE 342	3	Major EE 326	3	EE 438 or EE 480 (B)	3
Math 307	3	Major EE 372	3	Major EE 326L	1	TE Double Counted	
EB	3	Major EE 372L	1	DH or DL	3	EE 681 or EE 682 (B)	3
		EE 396	2	EE 495	1	Major Double Counted	
		Major EE 327	3	Outside Major Track TE	3	DS	3
				(Lab) TE	1	TOTAL BS CREDIT	122/123

Biomedical Concentration

Two biomedical-related Group II courses (EE 480 and EE 681 or EE 682) and an EB course approved by the Department's Undergraduate Curriculum Committee and listed on the EE website. EE 496 will be a biomedical project approved by the concentration coordinator.

UNDERGRADUATE PROGRAM NOTES

1. Refer to General Education Core Requirements in UHM Catalog for Diversification (DH, DL, DS) and FG Foundation Courses.
2. Math 251/252/253 may substitute for Math 241-244
3. Chem 181/181L or Chem 171/171L may substitute for Chem 161/161L and Chem 162.
4. Writing Intensive (W) required - 5 courses (minimum of 2 in upper division).
5. One course each required for Hawaiian, Asian & Pacific Issues (H), Oral Communication (O) and Contemporary Ethical Issues (E).
6. Enrollment in EE courses requires a grade of 'C' or better in all prerequisite courses.
7. Engineering Breadth (EB) is satisfied by a CEE, ME, OE or BE course at the 300-level or higher, CEE 270; or a physical, biological, or computer science course at the 300-level or higher and approved by the Department's Undergraduate Curriculum Committee.
8. Technical Electives (TE): The following courses may be used: EE 361/361L, 366, 367/367L, 343/343L, 351/351L, 344, 415.
9. ENGR 196/296/396 may substitute for EE 196/296/396.
10. A student along with a faculty member may propose an alternate track, which must be (1) equivalent in rigor & breadth to the above tracks; (2) endorsed by another faculty member; & (3) approved by the Department's Undergraduate Curriculum Committee.

GRADUATE LEVEL

Major EE 600 Cat 1	3	Outside Major EE 400+	3	Plan B: Elective 400+	3	Plan A: EE 700	9
Major EE 600 Cat 2	3	Outside Major EE 400+	3	Plan B: EE 699	3	Seminar Attendance (12)	
				Plan B: EE 699	3	Final Exam	
Plan A: Form I		Plan A: Form II		Plan A: Form III		Plan A: Form IV	
Plan B: Final Exam Form						TOTAL BS+MS CREDIT	152/153

GRADUATE PROGRAM NOTES

1. At most 3 credits of 400-level courses are allowed in graduate level.
2. Plan A: 1 credit of EE 700 must be registered during the semester of graduation.
3. Plan A: Students can petition to convert their EE 699 credits to EE 700 credits.
4. Plan B: Elective 400+ from Engr., Natural Sci., SOEST, Business, or by approval.
5. Plan B: 6 credits of EE 699 can be substituted by 6 credits in 600-level courses in EE.
6. More rigorous courses from the other programs may be used to satisfy major track or breadth requirements subject to prior approval from the graduate chair.
7. Relevant courses from the other programs may be used to satisfy elective course requirements subject to prior approval from the graduate chair.
8. Only one out of multiple courses with significantly overlapping contents (for example, cross-listed courses) can be used to satisfy any course requirement.
9. Only the courses with a grade of B or better (not B-minus) can count towards the course requirements.

MAJOR TRACKS

	Systems	Category I	Category II
Graduate		EE 615, 618, 640, 644, 650	EE 616, 617, 641, 642, 643, 645, 646 EE 648, 649, 693D, 693H
Electro-Physics	Category I and II (lumped)		
Graduate		EE 620, 621, 622, 624, 626, 627, 628, 671, 673 EE 675, 680, 681, 682, 685, 693C, 693I, 693J	
Computer	Category I		
Graduate		EE 602 EE 660	EE 604, 606, 607, 608, 609, 644 EE 665, 668, 693B, 693E, 693F ICS 612, 613, 632, 651

APPROVAL FOR GRADUATION: Initial: _____ Date: _____

CURRICULUM CHECK SHEET for EE-BAM Systems Track (August 2019)

The program of courses listed below satisfies the ABET accreditation criteria of 32 credits of mathematics and basic sciences, and 48 credits of engineering sciences and engineering design. Any deviations must be approved by the student's advisor, department chair, and dean. The University General Education Core and graduation requirements for Engineering are included.

ALL COURSES MUST BE TAKEN FOR LETTER (A-F) GRADES

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Chem 161 (DP)	3	Phys 170 (DP)	4	Math 243	3	Phys 274	3
Chem 161L (DY)	1	Phys 170L (DY)	1	Phys 272 (DP)	3	EE 296	1
FG	3	Chem 162 (DP)	3	Phys 272L (DY)	1	COMG 251 (DA)	3
						FG	3
H Focus (1)		E Focus (1)		O Focus (1)		W Focus (5)	

UPPER DIVISION

EE 315 Gateway (B+)	3	EE 323	3	EE 640 or EE 650 (B)	3	EE 496	3
EE 324	3	EE 323L	1	Major Double Counted		Econ 120, 130 or 131 (DS)	3
EE 371	3	EE 342	3	Major EE 415	3	EE 417 or EE 445 (B)	3
Math 307	3	Major EE 351	3	Major EE 343	3	TE Double Counted	
Outside Major Track TE	3	Major EE 351L	1	Major EE 343L	1	EE 615 or EE 617 (B)	3
(Lab) TE	1	EE 396	2	DH or DL	3	Major Double Counted	
		EB	3	EE 495	1	DS	3
						TOTAL BS CREDIT	122/123

UNDERGRADUATE PROGRAM NOTES

1. Refer to General Education Core Requirements in UHM Catalog for Diversification (DH, DL, DS) and FG Foundation Courses.
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Electro-Physics		Category I and II (lumped)	
Graduate		EE 620, 621, 622, 624, 626, 627, 628, 671, 673, 675, 680, 681, 682, 685, 693C, 693I, 693J	
Computer		Category I	Category II
Graduate		EE 602, EE 660	EE 604, 606, 607, 608, 609, 644, 665, 668, 693B, 693E, 693F, ICS 612, 613, 632, 651

APPROVAL FOR GRADUATION: Initial: _____ Date: _____