Senate Reference No. 15-23

TO: Fort Wayne Senate

FROM: David Cochran, Chair

Graduate Curriculum Subcommittee

DATE: February 17, 2016

SUBJ: 5 Year BS/MSE Program for Department of Electrical and Computer Eng

Graduate Subcommittee supports the above-subject proposal, and finds that the proposal requires no Senate review.

Graduate Academic Program Memo

Date: 11/16/15

From: Abdullah Eroglu, Chair, Department of Electrical and Computer Engineering

To: Carl N. Drnmmond, Vice Chancellor for Academic Affairs

Re: Proposal for 5 Year BS/MSE Program for Department of Electrical and Computer Eng.

Brief description of the program:

The proposed combined five-Year BS/MSE Program in the Department of Electrical and Computer Engineering (ECE) at IPFW is an integrated five-year degree program in which qualified students can receive a Bachelor of Science degree in Computer Eng. or Electrical Eng. and an MSE degree with area of specialization in Computer Engineering or Electrical Eng.

Brief rationale for program request:

The combined five-year BS/MSE degree program is proposed to (a) Improve the undergraduate program by making it more attractive for prospective students (b)Improve the graduate program by integrating high quality undergraduate students who have high potential of success in the graduate program (c) Have the required skilled workforce with higher education who are equipped with advanced knowledge to tackle more challenging problems in Northeast Indiana

Department Chair Signature — *Date* 11/16/2015

School Dean Signature — *Date* 11/16/15

Director of Graduate Studies — *Date*

Vice Chancellor.for Academic Affairs Signature — *Date*

Indiana University-Purdue University Chancellor Signature — *Date*

Please email academic_programs@ipfw.edu with questions about this form.
Send signed original to Carol Sterberger, Kettler Hall, Room 174

Proposal for Combined BS/MSE Program in Department of Electrical and Computer Engineering at IPFW

1. Names of the multiple-degree program

   - Combined Bachelor of Science in Computer Engineering and Master of Science in Engineering (BSCmpE/MSE) with the area of specialization in Computer Engineering or Electrical Engineering and

   - Combined Bachelor of Science in Electrical Engineering and Master of Science in Engineering (BSCmpE/MSE) with the area of specialization in Computer Engineering or Electrical Engineering

2. Name of the department and college/school(s) collaborating to offer the combined or dual degree

   This degree is to be offered by the Department of Electrical and Computer Engineering at IPFW.

3. Proposed date of initiation

   Fall semester 2016

Signature Page

_____ , , /-&1S--
Date

Carlos Romero Lois 11/!b/
Signature of Academic Dean Date
College of Engineering, Technology, and Computer Science

_____ _____
Dean of the Graduate School Date

_____ _____
Provost Date

Content

1. Proposal Summary

The proposed combined five-Year BS/MSE Program in the Department of Electrical and Computer Engineering (ECE) at IPFW is an integrated five-year degree program in which qualified students can receive a Bachelor of Science degree in Computer Engineering or Electrical Engineering and an MSE degree with area of specialization in Computer Engineering or Electrical Engineering. Students enrolled in this program can take up to nine (9) credits (three 500-level or higher graduate courses) from the graduate courses approved as BSCmpE or BSEE Technical Electives in five-year BS/MSE Program. These courses will also be counted towards the MSE program, thereby reducing the overall time required for the MSE degree completion.

The survey to understand if there is a need for such a combined program has been conducted among industry leaders in Northeast Indiana and undergraduate students who are enrolled in Department of Electrical and Computer Engineering (ECE). The survey results showed that Industry Leaders who are members of Industry Advisory Board for ECE Department in the region support the program by 100%. The results also showed that the significant percentage of the enrolled students who participated in the survey in Electrical and Computer Engineering programs are also in support of the proposed combined degree. The survey results and questions are added in Appendix A and B of this proposal.

2. Degrees to be Conferred

- **BSCmpE/MSE**: Bachelor of Science in Computer Engineering and Master of Science in Engineering degree with the area of specialization in Computer Engineering or Electrical Engineering

- **BSEE/MSE:** Bachelor of Science in Electrical Engineering and Master of Science in Engineering degree with the area of specialization in Computer Engineering or Electrical Engineering

3. Rationale and Need for the Combined or Dual-Degree

The combined five-year BS/MSE degree program is proposed to

- Improve the undergraduate program by making it more attractive for prospective students by giving them an option to have also a higher degree in accelerated time frame without losing the quality of education

- Improve the graduate program by integrating high quality undergraduate students who have high potential of success in the graduate program

- Have the required skilled workforce with higher education who are equipped with advanced knowledge to tackle more challenging problems in Northeast Indiana.

4. Objectives of the Combined or Dual-Degree Program

The objectives of the combined five-year BS/MSE degree program is to

- Keep both the undergraduate and graduate programs vibrant and healthy
- Meet the demand of skilled workforce in Northeast Indiana
- Have high graduation and retention rates by attracting high potential students via this program

5. Proposed Program Structure

a. Admission requirements and process

Admission to the combined five-year BS/MSE program may be granted under the following conditions:

1. Students must be enrolled in BSEE or BSCmpE program at IPFW and have not yet received an undergraduate BSEE or BSCmpE degree.
2. Students must have finished at least 60 credit hours in the respective BSEE/BSCmpE bingo sheet.
3. Students must have achieved an undergraduate grade point average (GPA) of at least 3.0 or equivalent at the time of application.
4. Have completed the mathematics sequence of courses equivalent to MA 165 (Calculus I), MA 166 (Calculus II), MA 261 (Multivariable Calculus), MA 351 (Linear Algebra), and MA 363 (Differential Equations).
5. Have completed the physics sequence of courses equivalent to PHYS 152 (Mechanics) and PHYS 251 (Heat, Electricity, and Optics).
6. The area of specialization for MSE must be declared at the time of application.
7. Acceptance into the program is conditional upon admission to the IPFW Graduate program.
8. No Graduate Record Examination (GRE) score is required.

Eligible students can consult with their academic advisor during the second semester of the junior year or earlier, and complete the *Five Year BS/MSE Program Application* (see Appendix C) and update their *Undergraduate Student One-Year Course Plan* (see Appendix D) accordingly.

b. Degree requirements

The requirements for BSEE/BSCmpE degree and MSE degree stay the same for students pursuing the degrees separately. For BSEE and BSCmpE degree requirement, please refer to the corresponding Bingo Sheets (see Appendix E). All students must complete a total of 30

credit hours as described in Section 3 in the MSE Graduate Guidelines of IPFW (see Appendix F). The BS degree must be awarded prior to the MSE degree.

Students can count up to nine (9) credit hours (three 500-level or higher graduate courses) from the list of graduate courses approved as technical elective courses in the combined BS/MSE program (see appendix G).

c. Scope and size of the program

The combined BS/MSE program will be open to students currently enrolled in the undergraduate program at the ECE Department at IPFW.

To get an estimate of the size of this program, the number of students with GPA 3.0 or above in Junior and Senior standings as of Fall semester 2015 were checked as below:

- Juniors with 3.0 or above: 20
- Seniors with 3.0 or above: 26

In addition, the ECE department currently offers dual BSEE and BSCmpE program. In Fall semester 2015, there are 14 dual EE/CmpE majors and 12 of them have GPA of 3.0 or better.

d. Administrative structure

Once accepted to the combined BS/MSE program, students must follow the following rules:

1. Students must take at least one graduate course each semester. Students may complete no more than 9 credits of graduate courses (500-level or higher) to be counted as undergraduate technical electives. These courses must be on the list of graduate courses approved as technical electives for the five-year BS/MSE program (see Appendix E) to be counted towards both the undergraduate BS degree and graduate MSE degree. Among these three courses, at least two must from the ECE core courses list, the remaining one can be from the Engineering elective courses (ECE and SE) list.

2. It is required that an undergraduate GPA of at least 3.0 is maintained in the five-year BS/MSE program.

3. During the final semester of undergraduate coursework, students must officially file the *Graduate School Admission Application* before the deadline specified by the Graduate Program.

4. After satisfactory completion of the BSEE/BSCmpE degree requirements the undergraduate degree will be awarded.

5. Before the end of the semester following the completion of the undergraduate degree, students must consult with the graduate advisor and complete the *Graduate Plan of Study* form (Form 6). Registration for subsequent semesters will be restricted until a draft of the plan of study has been filed. Graduate plan of study may be modified with approval of the student's graduate committee.

6. Students, who leave the program, whether for failure to meet the program requirements or by withdrawal, will cease to be graduate students but may continue as undergraduate students if they have not been awarded the BS degree. Such students may apply for regular admission to graduate study; but they will not be permitted to use on a subsequent graduate plan of study any graduate courses used to fulfill BS requirements.

6. Sustainability and Impact on the State and Region

Northeast Indiana is home to more than 160 advanced manufacturing companies in areas including electronics, defense, automotive, electric machines. There is a high demand for the industry to have skilled workforce. This most of the time requires engineers to have postgraduate degree education such as the Master level. We plan to fulfill the needs of the region and impact the following areas, positively by implementing the combined five-year BS/MSE program that will

- Contribute to the economic development of the region
- Contribute to the technological development of the region

We believe that the combined degree will be sustained through

- Integrating high potential students who has shown proven record of success in their undergraduate degree
- Continuous internal feedback to the five-year program from our own undergraduate program

7. Staffing and Infrastructure

It is expected that any other resources to implement the combined five-year BS/MSE degree program will not be needed.

Appendices

Appendix A: Survey Results for Industry Leaders

Appendix B: Survey Results for Enrolled Students in ECE Department

Appendix C: Five Year BS/MSE Program Application Form

Appendix D: Undergraduate Student One-Year Course Plan (example)

Appendix E: BSCmpE and BSEE Bingo Sheets

Appendix F: Section 3 – Degree Requirements in the Graduate Program Guidelines

Appendix G: Graduate courses approved as CmpE/EE technical electives for the Five-Year BS/MSE program

Appendix A

SURVEY QUESTIONS FOR INDUSTRY LEADERS

The Department of Electrical and Computer Engineering is planning to implement a 5-year BS/MSE joint program here at IPFW. This joint program will enable our students to earn both Bachelor of Science and Master of Science in Engineering degrees in their chosen discipline in 5 years. This will then enable them to have advanced knowledge and the necessary skill set to become part of the elite engineering workforce here in Northeast Indiana.

Could you please answer the following 3 questions regarding the implementation of this program:

1. Would you support a 5-year BS/MSE program within the ECE Department here at IPFW?
   Yes _____ No _____

2. Do you think this program will contribute positively to the economical develop of the region?
   Yes ____ No _____

3. Do you think this program will contribute positively to the technological development of the region?
   Yes _____ No _____

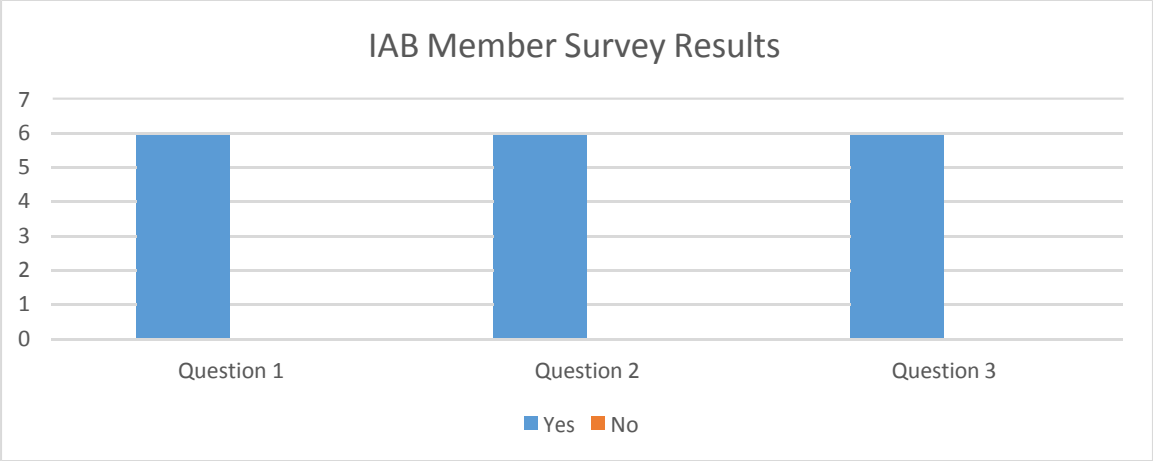
SURVEY RESULTS FOR INDUSTRY LEADERS

14 surveys were sent out, 6 responses were received.

Q1. 6 responses received: 6 Yes, 0 No

Q2. 6 responses received: 6 Yes, 0 No

Q3. 6 responses received: 6 Yes, 0 No



Appendix B

SURVEY QUESTIONS AND RESULTS FOR ECE STUDENTS

Q1 Would you be interested in a 5-year BS/MSE program at IPFW?

- ❍ Yes (1)
- ❍ No (2)

Q2 How many credit hours (on the bingo sheet) have you taken so far?

Q3 What is your current GPA?

The survey is sent out to all total of 146 enrolled students from freshman to Senior level in ECE Department. On the "Survey Statistics" in Qualtrics, the following details are obtained:

- 54 people answered question #1
- 50 people answered question #2
- 47 people answered question #3
- 47 respondents answered all 3 questions
- 5 people answered 60% of the questions
- 3 people answered 30% of the question

Would you be interested in a 5-year BS/MSE program at IPFW?

#	Answer	Bar	Response	%
1	Yes		36	72.00%
2	No		14	28.00%
	Total		50	100.00%

Appendix C

Department of Electrical & Computer Engineering
Indiana University-Purdue University Fort Wayne

Preliminary Application for the Five Year BS/MSE Program

Name: (Last)_____(First) _____ (Middle)_____

Gender: Female _____ Male _____ Purdue University ID: _____

Email address:_____Day time telephone: _____

Which program are you currently enrolled in?

____ Computer Engineering

____ Electrical Engineering

What will be your area of specialization for the MSE degree:

____ Computer Engineering

____ Electrical Engineering

How many credit hours of BSEE or BSCmpE coursework have you already completed: _____

What is your Cumulative/Total GPA: _____

Verify you have completed the following courses:

MA 165 _ MA 351 _____ PHYS 152 _____

MA 166 _____ MA 363 _____ PHYS 251 _____

MA 261 _____

Advisor: _____ Advisor signature: _____

Student Signature: _____ Date: _____

NOTE:

- Please attach a copy of your academic transcript.
- Please refer to the academic requirements in the Five Year BS/MSE Guidelines to get information about your eligibility for the program.

ELECTRICAL & COMPUTER ENGINEERING

STUDENT 1 YEAR COURSE PLAN

STUDENT NAME: _____ **DATE:** _____

STUDENT ID#: _____ DEGREE PROGRAM: CPE_____EE_____

Before completing this form check the class schedules@:
http :Uwww .ipfw.edu/ departments/etcs/depts/engr/cou rse/schedules.htm l

ADVISOR: _____ ADVISOR SIGNATURE: _____

THE STUDENTS PROGRAM PROGRSSION STANDING NEEDS TO BE UPDATED -YES / NO

NEW STANDING:----------

ACADEMIC PERIOD	CRN	COURSE NAME	DAYS/TIMES	CREDIT

STUDENTS CONTACT YOUR ADVISOR BEFORE MAKING ANY CHANGES IN THE COURSE PLAN, e.g., DROPPING A COURSE..

Appendix E

Bachelor of Science in Computer Engineering (BSCmpE) Degree
Department of Engineering

Effective: Fall 2015

All engineering & technical elective courses must have a combined minimum GPA of 2.0.

Course sequencing follows the academic year, and assumes beginning the program in the fall semester.

The math and physics departments require a C or better in some pre-requisite courses. Please consult the bulletin.

For more information visit http://www.engr.ipfw.edu

Legends: GE- General Emcalion, GE: A#, 8#, C# General Ed\lcation Calegozy, DC : Design Credrt, P: Prerequisrte, C: Co..equisrte

P = Pre-uisae, C = Coreouisite, DC = Desion <Content

Le 1l	MA 165 (4) P: MA 154 or MA 159 (C- or better), or placement GE :A3	CHM 115 (4) P: CHM 111 or 1 yr. H.S. C: MA 154 GE: B4	ENGR 127 (4) C: MA 154	ENG W 131 (3) P: ENG W 12'3 with C or better or placement GE: A1		
	Anlytc Georntjy & C.Jc I	General Chemistry	En9neemg Fl.I'ld I	Elem ComposiOOn I		
Le	MA 166 (4) P: MA 165 (C- or better) GE :A3	PHYS 152 (5) C: MA 166 GE: B4	ENGR 128 (4) P: ENGR 127 C: MA 165 C: ENG W 131 or COM 114	COM 114 (3) GE: A2		
	Anlytc Georntjy & C.Jc JI	Mechanics	En9neemg Fl.I'ld II	Fundament Of Speed>		
	MA 261 (4) P: MA 166 (C- or better)	PHYS 251 (5) P: PHYS 152 (C or better) C: MA 261	ECE 201 (3) C: MA 261	ECE 270 (4) C: ENGR 128 DC		
	Multivariate Calculus	Heat Eeclricily & Optics	Linear Circuit Anly I	InlroOigitl Sys Desgn		
	MA 351 (3) P: MA 166 (C- or better)	MA 363 (3) P: MA 261 (C- or better) C: MA 351 (C- or better) or current enrollmentin MA 351	ECE 202 (3) P: ECE 201 C: MA 363 DC	ECE 2'33 (2) P: ECE 201, COM 114, ENG W 131	CS 229 (4) P: ENGR 128	
	Elem li\ea1 Algebra	Differential Equations	Linear Circuit Anly II	Measure & Instrumentn	InlroducOOn to CIC++ Programming for ECE	
	ECE 255 (3) P: ECE 201 OC	ECE 301 (3) P: EOE 202	ECE 358 (3) P: ECE 270, CS 229 DC	ECE 362 (4) P: ECE 270, ECE 293, CS 229 DC	ECE 368 (3) P: CS 229 OC	
	Intr Electron Anly Des	Signals And Systems	Inlro To VHDL	Miaopro Sys & Intrfac	Data S1Nctures	
Le 1l	MA 175 (3) P: MA 165	ECE 208 (1) P: ECE 293 P: ECE 255 DC	ECE 302 (3) P: MA 363 C: ECE 301	ECE 465 (3) P: ECE 362	General Education Electire (3) 86 with alloutcomes	General Education Eleaire (3) Satisfy IPFW GE 87 requirements
	Discrete Math	Beciroo Dev & Des Lab	Probabilisfic Methods	Embedded Micro		
	ECE 405 (3) or ENGR 410 (3) P: ECE 301, ECE 362 EOE 368 (and permiSSion of the senior design advisor) DC GE: C8	ECE 485 (4) P: ECE 362, C: ECE 368 DC	Group 1 or 2: Technical Elective (3)	General Education Electire (3) BS with alloutcomes		
	Sr Engineering Des I	Embedd Real-Time OS				
	ECE 406 (3) or ENGRm (3) P: ECE 405 or ENGR 410 DC	ECE 437 (4) P: ECE 362, EOE 358 DC	Group 1: Technical Elective (3)	Group 1 or 2: Technical Elective (3)		
	Sr Engineering Des II	Computer Des & Prolotyp				

Revised March 2015

Total credit hours 120

Bachelor of Science in Electrical Engineering (BSEE) Degree
Department of Engineering

Effective date: Fall 2015

All engineering & technical elective courses must have a combined minimum GPA of 2.0

Course sequencing follows the academic year, and assumes beginning the program in the fall semester.

For more information visit http://ipfw.edu/engineering/

P = Prerequisite, C = Corequisite, DC = Design Content

A2	MA 165 (4) P: MA 154 or MA 159 (C- or better), or placement	CHM 115 (4) P: CHM 111 or 1yr. HS. Chem. C: MA 154	ENGR 127 (4) C: MA 154	ENG W 131 (3) P: ENG W 129 (C 0< better) *or* placement		
	Alty. Geometry & Calc. I Gen Ed A3	General Chemistry Gen Ed 84	Engr. Fundamentals I	Elem. Composition I Gen Ed A1		
A2	MA 166 (4) P: MA 165 (C-0< bet1e	PHYS 152 (5) C: MA 166	ENGR 128 (4) P: ENGR 127 C: MA 165, (ENG W 131, 0<COM 114) DC	COM 1H (3) (Corbette<)		
	Alty. Geometry & Calc. II Gen Ed A3	Mechanics Gen Ed 84	Engr. Fundamentals II	Fundament of Speech Gen Ed A2		
	MA 261 (4) P: MA 166 (C-0< bet1e	MA 351 (3) P: MA 166 (C-0< bet1e	PHYS 251 (5) P: PHYS 152 (C or bette C: MA 261	ECE 201 (3) C: MA 261	cs 229 (4) P: ENGR 128	
	Multivariate Calculus	Elem. linear Algebra	Heat Electricity & Optics	linear Circuit Anly. I	Intro. to CIC++ Ptog.	
A2	MA 363 (3) P: MA 261 (C-0< bet1e C: MA 351 (C- or better) or curretit enrollment i\ MA 351	ECE 202 (3) P: ECE 201 C: MA 363 DC	ECE 255 (3) P: ECE 201 DC	ECE 270 (4) C: ENGR 128 DC	ECE 293 (2) P: ECE 201, ENG W 131, COM 114	
	Offerenfial Equations	t>iear Circu Anly. II	ntr. Electron Anaiy. Des.	Intro. Digit! Sys. Desgn.	Measure. & Instrument	
	ECE 208 (1) P: ECE 255, ECE 293 DC	ECE 301 (3) P: ECE 202	ECE 324 (3) P: PHYS 251, ECE 255 C: ECE 208 DC	Technical Elective (3)	ME 253 (2) P: MA 261, PHYS 152	ECE 313 (1) C: ECE 324
	Eleciron. Dev. Des. Lab	Signals & Systems	ntr. Enegy Sys.	Group II	Statics & Dynamics	Energy Conversion lab
A2	ECE 302 (3) P: MA 363 C: ECE 301	ECE 311 (3) P: MA 363, PHYS 251	ECE 333 (3) P: ECE 301, ME 253 DC	ECE 362 (4) P: ECE 270, ECE 29:3, cs 229 DC		
	Ptobab istic Methods	Elec. & Magnetic Fields	Automatic Control Sys.	Micropro. Sys & 'Itrfac.		
A2	ECE 405 (3) or ENGR 410 (3) P: ECE 208, ECE 301, ECE 362 (and pernis.sion of the senior design advisor) DC GenEd Ga	ECE 428 (3) P: ECE 301, ECE 302 DC	ECE 436 (3) P: ECE 301 DC	Technical Elective (3) DC	General Education Elective (3)	
	Sr. Engr. Design I	Modem Commun. Syst	Digital Signal Process.	Group I	GenEd 85	
	ECE 406 (3) or ENGR 411 (3) P: ECE 405 or ENGR 410 DC	Technical Elective (3) DC	Technical Elective (3)	General Education Elective (3)	General Education Elective (3)	
	Sr. Engr. Design II	Group I	Group 11	GenEd BO	GenEd 87	

Revised March, 2015

Total Credits: 121

3 DEGREE REQUIREMENTS

A student pursuing the MSE degree must select the thesis or non-thesis option and an area of specialization. For the non-thesis option, a minimum of 30 credit hours of graduate-level coursework is required. For the thesis option, a minimum of 30 credit hours of graduate-level credits, of which 6 credit hours are research, is required. Pass/No-Pass grades are not permitted for courses on Master's plan of study. *Only 500-level courses and above can be used to satisfy degree requirements.*

3.1 Core Course Requirement

For the system engineering specialization area a student must successfully complete four required core courses as listed in Table 2. The core courses cover material essential to the area of systems engineering.

Table 2
Core courses for the System Engineering Specialization Area

Area of Specialization	Abbr.	Core Courses	Total Cr. Hrs.
Systems Engineering	SE	SE 510, SE 520, SE 530, SE 540	12

See **Error! Reference source not found.** for Course Titles

Error! Reference source not found. has a tentative schedule for the core courses listed in Table 2 for the next two years

For the computer engineering and electrical engineering specialization areas a student must successfully complete, for each area, four out of the six courses listed in Table 3.

Table 3
Core courses for the Computer Engineering and Electrical Engineering Specialization Areas

Area of Specialization	Abbr.	Core Courses (choose four out the listed six)	Total Cr. Hrs.
Computer Engineering	CmpE	ECE 538, ECE 547, ECE 567, ECE 600, ECE 608, ECE 661	12
Electrical Engineering	EE	ECE 538, ECE 549, ECE 581, ECE 584, ECE 600, ECE 604	12

See **Error! Reference source not found.** for Course Titles

Error! Reference source not found. has a tentative schedule for the core courses listed in Table 3 for the next two years

There are two tracks for the mechanical engineering specialization area. Students must successfully complete, for each track, the courses listed in Table 4.

Table 4
Core courses for the Mechanical Engineering Specialization Area

Track	Core Courses	Total Cr. Hrs.
Thermal/Fluids	ME 505, ME 509, ME 5xx, ME 5yy, ENGR 580	15
Mechanics	ME 550/CE 570, ME 5xz, ME/CE 5zz, ME 5yy, ENGR 580	15

See **Error! Reference source not found.** for Course Titles

- Students from one track can choose courses from the other track to satisfy their engineering electives and general electives requirements.
- Non-thesis option students are required to take ME 5xy Graduate Project

3.2 Engineering Elective Requirement (Depth Requirement)

For the computer engineering, electrical engineering and systems engineering specialization areas a minimum of two graduate engineering elective courses is required. Only one graduate engineering elective course is required for the mechanical engineering specialization area. Refer to **Error! Reference source not found.** for more information about these courses.

3.3 Math/Stat/ACS/CS Requirement

A minimum of two graduate-level courses from mathematics (MATH), statistics (STAT), or computer science (ACS or CS) is required. For more information about these courses refer to the following document (page 13),

http://new.ipfw.edu/dotAsset/240062.pdf

3.4 General Elective Requirement

For the computer engineering, electrical engineering and systems engineering specialization areas a non-thesis option student must successfully complete two general elective graduate-level courses from engineering, ACS, CS, OLS, TECH, MATH/STAT, BUS, PHYS, CHEM, and/or BIOL. Only one general elective graduate-level course is required for the mechanical engineering specialization area (non-thesis option). The purpose of these courses is to give students flexibility to tailor the program to meet his/her specific needs. For more information about these courses refer to the following document (page 13-14),
http://new.ipfw.edu/dotAsset/240062.pdf

3.5 Taking courses from other Purdue Campuses and Universities

Students are allowed to take courses from other Purdue campuses as well as from other accredited universities. In order to be able to count these courses towards their degree, students must first obtain permission from their committee by updating their plan of study. Additionally, they must maintain their active status at IPFW.
Students who want to take on-line courses at Purdue, West Lafayette through their Professional Education program must complete the on-line application for Non-Degree Seeking students to receive the negotiated discounted rate. The application is available at:
https://engineering.purdue.edu/ProEd/Admissions/non-degree_seeking_application.
The deadline for submitting this application is roughly one month prior to the first day of classes. Check with the Manager of the Engineering Professional Education program Enrollment Services and Client Relations for actual deadlines.
A student taking courses at other campuses for more than one semester should consult their advisor or the Director of Graduate Studies to determine if additional action is necessary to maintain their active status.

3.6 Research (Thesis) Credit Requirement

Research (thesis) credit is not required for students on non-thesis option. However, students pursuing the thesis option are required to register for ENGR 698 research (thesis) credit. Up to 6 hours of research (thesis) credit hours are allowed on the plan of study. Students must check with their major professor (i.e., thesis advisor) to determine the number of ENGR 698 hours appropriate for their program.

Table 5

Summary of course and credit-hour requirements

	Non-Thesis Option		Thesis Option	
	CmpE – EE – SE	ME	CmpE – EE – SE	ME
Core Courses	12	15	12	15
Engineering Elective Courses	6	3	6	3
MATH/STAT/ACS/CS Courses	6	6	6	6
General Elective Courses	6	3	—	—
Graduate Project	—	3	—	—
Research (Thesis) Credits	—	—	6	6
Total Credits on Plan of Study	30	30	30	30

Appendix G

Five-Year BS/MSE Program

Graduate Courses Approved as Computer Engineering Technical Electives

Group 1*

Course #	Course Name	Cr	Pre- and Co-requisites
ECE 538	Digital Signal Processing I	3	P: ECE 436, ECE 302
ECE 547	Intro to Computer Communication Networks	3	P: ECE 302
ECE 567	FPGA Designs for Signal Processing Applications	3	P: ECE 358, ECE 301
ECE 600	Random Variables and Signals	3	P: ECE 302

Group 2*

Course #	Course Name	Cr	Pre- and Co-requisites
ECE 540	Antenna Design, Analysis and Simulation	3	P: ECE 311
ECE 549	Software Defined Radio	3	P: ECE 428, ECE 436
ECE 581	Microware Engineering	3	P: ECE 255, ECE 311
ECE 584	Linear Control Systems	3	P: ECE/ME 333 or graduate standing

* Only ECE 5xx/6xx courses listed above can be counted towards five-year BS/MSE program. No other courses can be counted towards both an undergraduate degree and a graduate degree.

Updated September 2015

Five-Year BS/MSE Program

Graduate Courses Approved as Electrical Engineering Technical Electives

Group I*

Course #	Course Name	Cr	Pre- and Co-requisites
ECE 538	Digital Signal Processing I	3	P: ECE 436, ECE 302
ECE 549	Software Defined Radio	3	P: ECE 302
ECE 581	Microwave Engineering	3	P: ECE 255, ECE 311
ECE 600	Random Variables and Signals	3	P: ECE 302

Group II*

Course #	Course Name	Cr	Pre- and Co-requisites
ECE 540	Antenna Design, Analysis and Simulation	3	P: ECE 311
ECE 547	Introduction to Computer Communication Networks	3	P: ECE 302 or equivalent
ECE 584	Linear Control Systems	3	P: ECE/ME 333 or graduate standing
ECE 567	FPGA Designs for Signal Processing Applications	3	P: ECE 358, ECE 301

* Only ECE 5xx/6xx courses listed above can be counted towards five-year BS/MSE program. No other courses can be counted towards both an undergraduate degree and a graduate degree.

Updated September 2015