Department of Electrical and Computer Engineering
Checklist for PH.D. Minor in ECE

Student name: _____; email:_____

Month/year enrolled: _____; Graduation date:_____

I certify that 1) the information contained on this form is correct; and 2) courses included in this checklist are not included in the requirements towards another degree.

Student : _____ Date: _____

We certify that this student has met the minimum requirements for a Ph.D. Minor in ECE.

Signatures:

_____

ECE Ph.D. Committee Member, Date

_____

ECE Department Chairman, Date

1. Program of Study: (Select an option, and check all courses taken in that given option):

Option selected: _____

Communications Systems:

Required Courses:

	EC 3500	Analysis of Random Signals	(4-0)
	EC 3510	Communications Engineering	(3-1)
	EC 4550	Digital Communications	(4-0)
	EC 4580	Coding and Information Theory	(4-0)

At least one of:

	EC 4500	Advanced Topics in Communications	(3-0)
	EC 4530	Soft Radios	(3-2)
	EC 4570	Signal Detection and Estimation	(4-0)
	EC 4590	Communications Satellite Systems Engineering	(3-0)

At least one of:

	EC 4510	Cellular Communications	(3-0)
	EC 4560	Communications ECCM	(3-2)

Computer Systems:

At least three of:

	EC 3800	Microprocessor Based System Design	(3-2)
	EC 3820	Computer Systems	(3-1)
	EC 3830	Digital Computer Design Methodology	(3-2)
	EC 3840	Introduction to Computer Architecture	(3-2)

At least two of:

	EC 4800	Advanced Topics in Computer Engineering	(3-0)
	EC 4810	Fault Tolerant Computing	(3-2)
	EC 4820	Advanced Computer Architecture	(3-1)
	EC 4830	Digital Computer Design	(3-1)
	EC 4840	Advanced Microprocessors	(3-1)
	EC 4850	High Speed Networking	(3-2)
	EC 4870	VLSI Systems Design	(3-2)

Guidance, Control, and Navigation Systems Option:

Required Courses:

	EC 3310	Optimal Estimation: Sensor and Data Association	(3-2)
	EC 3320	Optimal Control Systems	(3-2)
	EC 4350	Nonlinear Control Systems	(3-2)

At least two of:

	EC 4300	Adv. Topics in Modern Control Syst.	(3-1)
	EC 4320	Design of Robust Control Systems	(3-2)
	EC 4330 /4340	Navigation, Missile, and Avionics Systems	(2-2)
	EC 4360	Adaptive Control Systems	(3-1)

Solid State Microelectronics and Power Systems Option:

At least two of:

	EC 3130	Electrical Machinery Theory	(4-2)
	EC 3150	Solid State Power Conversion	(3-2)
	EC 3200	Advanced Electronics Engineering	(3-2)

At least two of:

	EC 4130	Advanced Electrical Machinery Systems	(4-2)
	EC 4150	Advanced Solid State Power Conversion	(4-1)
	EC 4220	Introduction to Analog VLSI	(3-1)

Signal Processing Systems Option:

Required Courses:

	EC 3400	Digital Signal Processing	(3-1)
	EC 3410	Discrete-Time Random Signals	(3-1)
	EC 4440	Statistical Digital Signal Processing	(3-1)

At least two of:

	EC 4400 or EC 4910	Advanced Topics in Signal Proc. / DSP for Wireless Communications	(3-0) / (3-1)
	EC 4410	Speech Signal Processing	(3-1)
	EC 4430	Multimedia Information & Com.	(3-1)
	EC 4450	Sonar Systems Engineering	(4-1)
	EC 4460	Artificial Neural Networks	(3-1)
	EC 4480	Image Processing and Recognition	(3-2)

Signals Intelligence Option:

Required Courses:

	EC 3850	Computer Communications Methods	(3-1)
	EC 3750	SIGINT Systems I	(3-2)

Three required courses in ONE of the following sub-options:

1. Communications Engineering:

	EC 3500	Analysis of Random Signals	(4-0)
	EC 3510	Communications Engineering	(3-1)
	EC 4550	Digital Communications	(4-0)

2. Signal Processing Systems:

	EC 3400	Digital Signal Processing	(3-1
	EC 3410	Discrete-Time Random Signals	(3-1)
	EC 4570	Signal Detection and Estimation	(4-0)

3.Joint Services Electronic Warfare:

	EC 3600	Electromagnetic Radiation, Scattering, and Propagation	(3-2)
	EC 4610	Radar Systems	(3-2)

	EC 4680	Radar Electronic Warfare Techniques and Systems	(3-3)

Three courses from either of the sub-options not picked or from the following list:

	EC 3210	Introduction to Electro-Optical Engineering	(3-1)
	EC 3310	Optimal Estimation: Sensor and Data Association	(3-1)
	EC 3550	Fiber Optic Systems	(3-1)
	EC 3610	Microwave Engineering	(3-2)
	EC 3630	Radiowave Propagation	(3-0)
	EC 3800	Microprocessor Based System Design	(3-2)
	EC 3840	Introduction to Computer Architecture	(3-2)
	EC 4420	Modern Spectral Analysis	(3-1)
	EC 4440	Statistical Digital Signal Processing	(3-1)
	EC 4560	Communications ECCM	(3-2)
	EC 4580	Coding Information Theory	(4-0)
	EC 4590	Communications Satellite Systems Engineering	(3-0)
	EC 4700	Advanced Topics in Information Warfare	(3-0)
	EC 4750	SIGINT Systems II	(3-4)

One of the following graduate courses in Mathematics:

	MA3046	Matrix Analysis	(4-1)
	MA4362	Astrodynamics	(3-0)
	MA4570	Cryptography	(4-0)

- Network Engineering Option -

Required Courses:

	EC 3850	Computer Communications Methods	(3-1)
	EC 3500 or EC3410	Analysis of Random Signals Discrete-Time Random Signals	(4-0) (3-1)
	EC 4850	High-Speed Networking	(3-2)
	EC 4940	Mobile Ad Hoc Wireless Networking	(3-2)

At least two of:

	EC 4960	Internet Engineering	(3-1)
	EC 4430	Multimedia Information and Communications	(3-1)
	EC 4700 or EC 4920	Advanced Topics in Network Eng Advanced Telecommunication Systems Eng	(3-2) (3-2)
	EC 3760	Information Operations Systems	(3-2)
	EC 3550	Fiber Optic Systems	(3-1)

- Sensor Systems Engineering Option -

At least two of:

	EC3210	Introduction to Electro-Optical Engineering	(3-0)
	EC 3600	Electromagnetic Radiation, Scattering & Propagation	(3-2)
	EC 3610	Microwave Engineering	(3-2)
	EC 3630	Radiowave Propagation	(3-0)

Complete at least three additional courses:
(1) Complete either of the first two sub-options AND also complete one additional course from any listed here (including those in the first block),
OR
(2) Complete the Underwater Sensors sub-option.

Radio Frequency Sensors (choose 2 of 4)

	EC 4610	Radar Systems	(3-2)
	EC 4630	RCS Prediction	(3-0)
	EC 4640	Airborne Radar Mode Processing	(3-0)
	EC 4600	Advanced Topics in Sensor Systems	(3-0)

Sensor Attack and Protection (choose 2 of 4)

	EC 3700	Network-Centric Electronic Warfare I	(3-2)
	EC 4690/80(US)	Network-Centric Electronic Warfare II	(3-3)
	EC 4900	Digital Receivers and Sensor Technology	(3-2)
	EC 4600	Advanced Topics in Sensor Systems	(3-0)

Underwater Sensors (first three courses are required)

	EC 3500 or EC 3410	Analysis of Random Signals Discrete Time Random Signals	(4-0) (3-1)
	EC 3450	Fundamentals of Ocean Acoustics	(4-0)
	EC 4450	Sonar Systems Engineering	(4-1)
	EC 4600	Advanced Topics in Sensor Systems	(3-0)