New Jersey Institute of Technology

Helen and John C. Hartmann Department of Electrical and Computer Engineering

Handbook for Graduate Students

(Effective October 2016)

Available on the Web:
http://ece.njit.edu/academics/graduate/

Introduction

We are pleased to present our *Handbook for Graduate Students* for students enrolled in programs in the Helen and John C. Hartmann Department of Electrical and Computer Engineering (ECE). This document is a compilation of both Institute and ECE Department regulations and procedures of particular interest to M.S. and Ph.D. students. Please note that the Institute's *Graduate Catalog* (http://catalog.njit.edu/graduate/newark-college-engineering/electrical-computer/) also contains information you will find helpful. Changes that may occur in ECE Department procedures will be posted on the bulletin board near 200 ECEC. We expect to revise this handbook on an annual basis.

Graduate degrees offered by the Department of Electrical and Computer Engineering.

- MS in Computer Engineering
- MS in Electrical Engineering
- MS in Internet Engineering
- MS in Telecommunications
- MS in Power and Energy Systems
- Ph.D. in Computer Engineering
- Ph.D. in Electrical Engineering

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I. ADMINISTRATION

Chair:
Dr. Leonid Tsybeskov, 207 ECE Center, (973) 596-6594, **Tsybeskov@njit.edu**

Associate Chair for Undergraduate Studies:
Dr. Marek Sosnowski, 237 ECE Center. (973) 596-3541, sosnowski@njit.edu

Associate Chair for Graduate Studies:
Dr. Durgamadhab Misra, 339 ECE Center, (973) 596-5739, dmisra@njit.edu

Director for MS Computer Engineering:
Dr. MengChu Zhou, 335 ECE Center, (973) 596-6282, zhou@njit.edu

Directors for MS Electrical Engineering:
Dr. Durgamadhab Misra, 339 ECE Center, (973) 596-5739, dmisra@njit.edu

Director for MS Telecommunications, MS Internet Engineering, Ph.D. CoE and Ph.D. EE:
Dr. Roberto Rojas-Cessa, 323 ECE Center, (973) 596-5692, rojasces@njit.edu

Director of M.S. in Power and Energy Systems
Dr. MengChu Zhou, 335 ECE Center, (973) 596-6282, zhou@njit.edu

Ph.D. in Computer Engineering
Dr. Durgamadhab Misra, 339 ECE Center, (973) 596-5739, dmisra@njit.edu

Ph.D. in Electrical Engineering
Dr. Durgamadhab Misra, 339 ECE Center, (973) 596-5739, dmisra@njit.edu

Staff:

Ms. Teri Bass Administrative Assistant I, 235 ECE Center, (973) 596-3513, bass@njit.edu

Ms. Joan Mahon, Assistant to the Chair, 233 ECE Center, (973) 596-3524, mahon@njit.edu

Other Helpful Directory Information:

Office of Graduate Studies, 140 Fenster Hall, (973) 596-3462, ziavras@njit.edu
Career Development Services, 4th & 5th Floors Campbell Hall, (973) 596-3100, mass@njit.edu
Student Financial Aid Service, Student Mall, (973) 596-3479, finaid@njit.edu
Office of the Dean of Students, Campbell Hall, (973) 596-3466, doss@njit.edu
Office of International Students and Faculty, 140 Fenster Hall,
(973) 596-2451, international.students@njit.edu
Office of the Registrar, Student Mall, (973) 596-3236

FACULTY/STAFF DIRECTORY

Name	Office	Telephone	Email
Ali Abdi	303 ECEC	596-5621	abdi@njit.edu
Ali Akansu	317 ECEC	596-5650	akansu@njit.edu
Nirwan Ansari	343 ECEC	596-3670	nirwan.ansari@njit.edu
Teri Bass	227 ECEC	596-3513	bass@njit.edu
John Carpinelli	315 ECEC	596-3536	carpinelli@njit.edu
Atam Dhawan	301 ECEC	596-5442	atam.p.dhawan@njit.edu
Mohammed Feknous	311 ECEC	596-6460	mohammed.feknous@njit.edu
Bernard Friedland	351 ECEC	596-3509	bf@njit.edu
Hongya Ge	333 ECEC	642-4990	ge@njit.edu
Haim Grebel	325 MICRO	596-3533	haim.grebel@njit.edu
Alexander Haimovich	321 ECEC	596-3534	haimovic@njit.edu
Edwin Hou	357 ECEC	596-3521	hou@njit.edu
Walid Hubbi	329 ECEC	596-3518	hubbi@njit.edu
Moshe Kam	331 ECEC	596-3521	moshe.kam@njit.edu
Abdallah Khreishah	349 ECEC	596-3528	abdallah.khreishah@njit.edu
Joerg Kliewer	213 ECEC	596-3519	jkliewer@njit.edu
Dong-Kyun Ko	215 ECEC	596-3515	dong.kyun.ko@njit.edu
Serhiy Levkov	203 ECEC	642-7676	levkov@njit.edu
Qing Gary Liu	345 ECEC	596-3526	qliu@njit.edu
Xuan Liu	317 ECEC	596-5693	xliu@njit.edu
Joan Mahon	233 ECEC	596-3524	mahon@njit.edu
Oksana Manzhura	205 ECEC	596-35-4	oksana.manzhura@njit.edu
Durgamadhab Misra	339 ECEC	596-5739	dmisra@njit.edu
Hieu Nguyen	309 ECEC	596-3534	Hieu.p.nguyen@njit.edu
Edip Niver	406 MICRO	596-3542	niver@njit.edu
Ratna Raj	347 ECEC	596-8289	Ratna.raj@njit.edu
Bipin Rajendran	337 ECEC	596-3516	bipin@njit.edu
Roberto Rojas-Cessa	323 ECEC	596-3508	rojas@njit.edu
Jacob Savir	209 ECEC	596-5681	savir@njit.edu
Yun-Qing Shi	341 ECEC	596-3501	shi@njit.edu
Osvaldo Simeone	211 ECEC	495-5710	osvaldo.simeone@njit.edu
Marek Sosnowski	237 ECEC	596-3541	sosnowski@njit.edu
Leonid Tsybeskov	207 ECEC	596-6594	leonid.tsybeskov@njit.edu
Cong Wang	313 ECEC	596-5744	cong.wang@njit.edu
Gerald Whitman	405 MICRO	596-3232	whitman@njit.edu
Mengchu Zhou	349 ECEC	596-6282	zhou@njit.edu
Sotirios Ziavras	353 ECEC	596-5651	ziavras@njit.edu

LABS/CENTERS/ORGANIZATIONS

Akansu	**104 ECEC**	**(973) 642-7012**
Ansari	**401B/410A FMH**	**(973) 596-3186**
Ansari	**410D FMH**	**(973) 596-5814**
Dhawan	**402 FMH**	**(973) 596-3409**
Friedland	**406 FMH**	**(973) 596-5261**
Grebel	**004 FMH**	**(973) 596-5523**
Grebel	**010 FMH**	**(973) 596-5631**
Grebel/EIC	**306 MICRO**	**(973) 596-8294 or 5738**
Haimovich	**101 FMH**	**(973) 596-5659 or 5809**
Hubbi	**410C FMH**	**(973) 596-3552**
Khreishah	**410B FMH**	**(973) 596-5366**
Kliewer	**101B FMH**	**(973) 596-3355**
Ko	**014 FMH**	**(973) 596-8492**
Liu, Qing Gary	**105 FMH**	
Liu, Xuan	**009 FMH**	**(973) 642-7738**
Misra	**114 FMH**	**(973) 596-6509**
Nguyen	**003 FMH**	**(973) 596-3544**
Niver	**308 MICRO**	**(973) 596-8453**
Rajendran	**410D FMH**	**(973) 642-7301**
Rojas-Cessa	**220 FMH**	**(973) 596-3540**
Rojas-Cessa	**101C FMH**	**(973) 642-7062**
Shi	**402 FMH**	**(973) 596-3409**
Sosnowski	**009A/012 FMH**	**(973) 642-7782**
Tsybeskov	**420 TIER/112 FMH**	**(973) 596-3543**
Wang	**401A FMH**	**(973) 596-5744**
Whitman	**405 MICRO**	**(973) 596-3232**
Zhou	**217 FMH**	**(973) 596-3522**
Ziavras	**211B FMH**	**(973) 596-6508**
Eta Kappa Nu	**303 FMH**	**(973) 596-5615**
EYBCCSPR	**101 FMH**	**(973) 596-5659 or 5809**
TA Offices	**414 FMH**	**(973) 596-8557**

II. ADMISSIONS

The following sections contain special admission issues of concern to students in the Department of Electrical and Computer Engineering. Please consult the *Graduate Catalog* http://catalog.njit.edu/graduate/newark-college-engineering/electrical-computer/ for other issues regarding admission.

1. GRE and TOEFL

The Graduate Record Examination (GRE) General Section is required of all applicants to doctoral programs, all full-time applicants to master's programs, all applicants seeking financial support, and all applicants whose most recent degree was awarded from an institution outside of the United States.

The Test of English as a Foreign Language (TOEFL) is required for all international students applying to a graduate program, the score of which must be at least 79. Applicants with scores below 79 are not considered for admission.

2. Conditional Admission

Conditional admission may be granted to applicants who do not have the appropriate academic background required for a particular degree program, but who have an academic record that meets NJIT's scholastic standards. Once granted conditional admission, students must complete conditional or bridge courses specified by the university within their first two semesters. Such courses may be at either the undergraduate or graduate level and are NOT counted as degree credits, although all graduate courses are calculated in the grade point average (GPA). Students must attain grades specified by the University and are not permitted to take more than 9 credits that count as graduate degree credits at NJIT before meeting the terms of conditional admission. Failure to meet these conditions may result in dismissal from the University.

3. Change of Major

Students are admitted to one graduate degree program and not to the University as a whole. Students who wish to change majors must remain and take courses in the original program for a semester and then file an application for the new program by using a program transfer form. There is no guarantee that the new application will be successful. Those on support may risk losing support from the original department and cancellation of a current award. International students and others who must be registered full-time will still be required to have a 9-credit registration.

4. Change of Degree Level

Students who wish to change the level of the degree program in which they are enrolled must file an application for admission to the new degree level. There is no guarantee that the application will be successful. Students who wish to drop down to a master's degree program from a doctoral program should be aware of the impact of this action on current and future financial support.

5. Non-Degree (Non-Matriculated) Students

Non-matriculated students may be permitted to take a maximum of 9 graduate-level credits over three registration periods, except students seeking a graduate certificate. These students may take a maximum of 12 graduate-level credits over four registration periods. Students wishing to take credits beyond these limits must apply and be accepted to a degree program as a matriculated student. Academically qualified students who do not desire to enter degree programs may enroll for certain individual graduate courses. Such students must present transcripts of previous academic work or other appropriate evidence at each registration in order to indicate adequate preparation for the course work involved. If approved by the Associate Chair for Graduate Studies and by the Office of University Admissions, registration will be permitted if space is available. Permission to enroll as a non-matriculated student does not imply eventual admission to a degree program.

Graduate Certificate Programs

NJIT offers clusters of courses in concentrated areas for students who wish to obtain a certificate of completion. In general, these require completion of 12 credits at the graduate level. Students in these programs are considered to be non-matriculated students for the duration of the certificate program.

Upon completion of the certificate program, the student may apply for admission to matriculated status. In the event that the petition is approved, some or all of the courses taken in the certificate may be applied toward satisfying the M.S. degree requirements. The courses must be applicable to the M.S., and the grade in each accepted course must be B or better.

III. REGISTRATION AND OTHER ACADEMIC POLICIES

1. Approval of Course of Study

Students are required to arrange a conference with their graduate advisor as soon as possible after notification of admission (international students should do so immediately after arrival in the United States) to formulate a course of study that meets the requirements of the particular degree program and reflects the interests and aspirations of the individual student. New students are required to obtain advisor approval for initial course registration.

2. Continuous Registration Requirement

Once admitted to a degree program, students must be continuously registered each semester until they complete degree requirements. Students are not permitted to register for Maintaining Registration (MR) if their project, thesis or dissertation is unfinished without approval for a Leave of Absence by the Dean of Graduate Studies. Students who complete work for Master's Projects or Theses over several semesters receive a final grade (A, B, C) in the semester in which the work is completed and the final document is approved. The final grade of a completed doctoral dissertation is P. An interim grade of S or U is given for semesters other than the final semester.

3. Transfer of Credits from Outside NJIT

Transfer credits are calculated by NJIT according to the total number of instructional minutes earned at the other institution. The equivalent instructional minutes of a maximum of 9 credits of graduate work, taken within seven years, from accredited U.S. educational institutions may be transferred and applied to degree requirements at NJIT. Credits from educational institutions outside the United States cannot be transferred. On a case by case basis, up to 9 credits may be waived for non-collegiate based instruction. The university does not grant transfer credit for work experience or other non-instructional activities. Credits are transferred only if the courses were taken for full academic credit, were never applied to any other degree, and a final grade of at least B was attained. In addition, the student's graduate advisor and the Office of Graduate Studies must agree that such courses directly relate to the student's program of study before they can be transferred.

Requests for transfer credit must be submitted on a form available from the Office of Graduate Studies, accompanied by course descriptions from the other educational institution. Students must also arrange for the other institution to send an official transcript to the Office of Graduate Studies at NJIT. Requests may be submitted and approved at any time but are not added to a student's record until matriculation is granted. Grades that are transferred will not be calculated in cumulative grade point averages.

4. Enrollment Status

Full-time Students: Students registered for 9 credits or more throughout an entire semester are considered full-time. International students and students receiving financial awards must have full-time status each semester.

Part-Time Students: Students registered for fewer than 9 credits during a semester, unless certified as full-time by the Office of Graduate Studies.

5. Full-time Certification

Graduate students must be registered for not less than 9 credits each semester in order to be accorded full-time status. The Office of Graduate Studies may certify certain students as full-time even if they are not registered for 9 credits, as follows:

- Students who have fewer than 9 credits remaining for completion of all degree requirements and are registered for all credits needed to complete the degree. This certification can only be given for one semester.
- Doctoral students preparing for qualifying examinations or research proposal presentations register for at least 9 credits. Course credit possibly includes 3 credits of pre-doctoral research.
- Doctoral candidates who have completed all course work, other degree and credit requirements, and who are registered in Dissertation Research and Seminar for at least 1 credit each semester.
- Students who originally registered for 9 credits but now have substantial extenuating circumstances requiring a reduction in course load. Normally this certification applies only in cases of medical or similar emergencies which incapacitate a student for a significant part of a semester. Improper course registration, failure to seek proper advisement, inadequate academic progress, or risk of earning a weak or failing grade are not extenuating circumstances.
- Students on a full-time cooperative education assignment and registered in the Co-op Work Experience or equivalent course. When students are in their final semester of study, they may be certified as full-time and approved for co-op. The Office of Graduate Studies should be consulted for limits on cooperative education, as it has an impact on full-time certification and allowable time to complete the degree.

Audited courses and withdrawn courses do not count toward full-time status; ESL (English as a Second Language) courses do count as one course.

Forms for Full Time Certification for Master's Degree Students can be found at http://www5.njit.edu/global/sites/global/files/FULL%20TME%20CERT%20FORM_Masters%20fall%202016.pdf

Forms for Full Time Certification for Doctoral Degree Students can be found at: http://www5.njit.edu/global/sites/global/files/FULL%20TME%20CERTIFICATION%20FORM_PHD_Sept16_3.pdf

6. Grade Point Average Calculation

In order to obtain a graduate degree, candidates must have a cumulative grade point average of at least 3.0 in all graduate-level courses, exclusive of grades in Master's Project or Master's Thesis. All 500-level or higher courses are included in the cumulative grade point average, regardless of applicability to a specific degree. Only the initial grades for graduate courses that have been repeated once are excluded from GPA calculations. In addition, the cumulative grade point average for all courses counted for the degree, exclusive of Master's Project or Master's Thesis, must be 3.0 or better.

7. Expiration of Credit

For all degrees, credits expire seven years after completion of the semester in which they are earned. Expired courses cannot be used to fulfill degree requirements and must be replaced by current credits. Degree requirements must be completed within seven consecutive years of original admission. Approved leaves of absence do not count against the seven-year limit for completion of the degree although the validity of individual courses may still expire during this time. Requests for waivers of the seven-year limit for extenuating circumstances, other than mere failure to register, are made to the Dean of Graduate Studies. The technical content and remaining currency of courses are considered in evaluating these requests.

8. Grades

The Registrar issues a grade report to each student at the end of each semester. Grade point averages are calculated for each semester and cumulatively for the entire graduate record. Undergraduate credits taken by graduate students are not counted. The following grades are used:

Grade	GPA	
A	4.0	Excellent
B+	3.5	Good
B	3.0	Acceptable
C+	2.5	Fair
C	2.0	Minimum Performance
F	0.0	Failure
I		Incomplete
W		Approved Withdrawal
AUD		Audited (No academic credit)
S or U		Satisfactory or Unsatisfactory (interim grades for thesis and dissertation and final grade for Co-op)
P		Passing for Doctoral Dissertation and Defense

9. Incomplete Grades

A grade of I (Incomplete) is given when courses cannot be completed because of special circumstances. Students on academic probation are not permitted incompletes without permission from the Office of Graduate Studies. Required course work may be finished at the discretion of the instructor, no later than the end of the subsequent semester. A letter grade must be assigned or a grade of "F" will be given. Students nominated for financial awards must have I grades resolved by the fourth week of the subsequent semester to allow a determination of their eligibility for the award. This grade cannot be changed. A grade of "I" cannot be given for thesis, project, dissertation, seminar, pre-doctoral research courses, or ESL courses.

10. Course Withdrawals

Withdrawal from graduate courses, without academic penalty, is permitted until the end of the ninth week of the semester. A notation of W on the student's transcript signifies an approved withdrawal. Withdrawal forms may be obtained from the Office of the Registrar. Approved withdrawal takes effect when the Registrar receives the completed withdrawal form from the student within the designated nine-week period. A failing grade will be issued to students who do not notify the Registrar of withdrawal in this manner. Students who do not obtain an approved withdrawal are obligated to pay full tuition and

fees. Any refunds for approved withdrawals follow the refund schedule established by the Registrar. Withdrawals that affect conditions for retention of financial awards or support, continued full-time status, academic probation, progress toward a degree, admission, ESL, or participation in special programs must be approved by the Office of Graduate Studies. After the ninth week of the semester, students may withdraw from a course only for extenuating circumstances with the approval of the Dean of Graduate Studies and by the graduate program advisor.

11. Auditing a Course

Students who wish to audit a course must state their intention to do so at the time of registration. Change in auditing status is not permitted once a semester has begun. Students who audit are required to pay full tuition and fees for the course. Financial awards are not applicable to audited courses. Audited courses are not counted in determining full-time status. Students on probation are not permitted to audit.

12. Satisfactory and Unsatisfactory

The grades S or U report progress in project, thesis, dissertation, and pre-doctoral research courses. These also can be final grades in seminar, co-op, teaching methods, and ESL courses. The grade of S is given for satisfactory progress and U is given for unsatisfactory progress. Students who fail to meet with their advisors will receive a U grade. Credits for courses in which U is received cannot count toward a degree.

13. Course Repetition

Graduate students may request approval to repeat a course using a form available from the Office of Graduate Studies. The grade received in a repeated course is calculated in the cumulative grade point average, but the first grade still appears on the transcript. A maximum of two courses may be repeated in graduate studies. Students may not repeat a course without prior approval from the department and the Office of Graduate Studies. Students who receive an F in a course will be required to repeat that course. The Dean of Graduate Studies should be consulted if the course is no longer offered or not applicable to the student's current program.

14. Project, Thesis and Dissertation

Theses and dissertations submitted for graduate degrees must follow a prescribed format. A manual outlining the university requirements for thesis and dissertation submission is available in NJIT's bookstore. The Office of Graduate Studies should be consulted for more information.

Letter grades are given for satisfactory completion of the Master's Project, and P is used as a final grade after successful defense of the Master's thesis. Projects and theses must be submitted first, before a grade can be given. Theses and dissertations are submitted to the Office of Graduate Studies. Projects are submitted to the project graduate advisor. Semester and cumulative GPA calculations by the Registrar only include courses for which a letter grade is given. For the purpose of the GPA, the Registrar only calculates the grades for credits earned in the semester in which the project is completed. Letter grades cannot be given for an unfinished project or thesis, nor for work not submitted. A grade of P is given for satisfactory completion of a doctoral dissertation and defense. Receipt of two U grades for project, thesis, dissertation, or pre-doctoral research will result in a letter grade of F in place of the second U and dismissal from the program. Students may not register for project, thesis, or dissertation credits until they arrange for a department- or program-approved faculty advisor to supervise the work. Continued registration for additional thesis, project, or dissertation credits will be allowed as long as the advisor

grades the work to show that there is satisfactory progress. Credits for which a U (unsatisfactory) grade is given are not counted as degree credits toward completion of the thesis, project, or dissertation.

Master's project or master's thesis registration must be at least 3 credits during a semester or summer session. Doctoral dissertation registration must be at least 1 credit during a semester. All students must have their advisor's signature and section identification each time they register for project or thesis. Students must register for thesis, project, or dissertation work within the deadlines established by the Registrar. Doctoral dissertation registration may be 3 credits during a summer session. Maximum credit registration each semester is 12 credits for the doctoral dissertation, 6 credits for the master's thesis, and 3 credits for the master's project. Once a student has begun the master's project, the master's thesis, or the doctoral dissertation, he or she must register for these courses each semester until the project, thesis, or dissertation is completed. Unapproved interruptions in project, thesis or dissertation may be subject to billing for omitted credits. Students must be registered in project, thesis or dissertation in any semester or summer session in which completion is expected. A final grade is assigned by the advisor for thesis or dissertation when the Office of Graduate Studies confirms it has received all documents in final and approved form and all related bills have been paid.

Approval by the graduate program advisor and the Office of Graduate Studies must be obtained if the student wishes to interrupt the thesis, project, or dissertation for a semester or more. Students must maintain continuity of registration for theses and dissertations (implies registration for fall or spring, but not for summer). If a master's project is not completed after two semesters of registration, a final grade of F is given. Failure to complete a master's project by students who receive financial support may result in dismissal. No more than four semesters and two summers of registration for a master's thesis are permitted. Failure to complete a master's thesis within this period will result in a final grade of F, and may result in dismissal. No more than six years of registration for doctoral dissertation is permitted. Failure to complete a doctoral dissertation in this period will result in a final grade of F and dismissal from the program.

Students who require additional time to complete a project, thesis, or dissertation should appeal for an extension, in writing, to the graduate program advisor, the department, and the Office of Graduate Studies. If the appeal for an extension is denied, the student may appeal further in the following order: department chairperson, dean of the school or college, and finally to the Committee on Graduate Appeals. Appeals may be accompanied by any material that the student believes appropriate. Appeals to the Committee on Graduate Appeals should be directed to the Dean of Graduate Studies. All deCSions of the Committee on Graduate Appeals are final.

15. Deadline Waiver

Applications for January or May graduation for students whose master's thesis or doctoral dissertation is substantially complete, but who are unable to submit it in final form by the specified date, may request a deadline waiver from the Office of Graduate Studies before it is due. Students granted a waiver may be permitted until a date specified by the Office of Graduate Studies to submit the final copy of the work. Such students may then apply for the next scheduled graduation without having to pay for additional thesis or doctoral dissertation credits. Contact the Office of Graduate Studies for further information.

IV. MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

1. Admission Requirements

Applicants are expected to have excellent undergraduate backgrounds in physics, mathematics (through differential equations and vector analysis), electrical networks and devices, electronics, analysis and design methods, transients, electromagnetic fields, and appropriate laboratory work in some of these areas.

Bridge Program~Students who have earned a Bachelor of Science in Engineering Technology (B.S.E.T.) degree, or who lack an appropriate background, must take the following courses, in addition to the degree requirements, to make up deficiencies. They must obtain a grade of B or better in each course. At the discretion of the department, students who have taken courses equivalent to these may have their bridge program requirements reduced accordingly.

EE 232-Circuits and Systems II
EE 321-Random Signals and Noise
EE 333-Circuits and Systems III
EE 361-Electromagnetic Fields I
EE 362-Electromagnetic Fields II
EE 372-Electronic Circuits II
EE 373-Electronic Circuits III

2. Degree Requirements

Upon entering the program, students select an area of specialization supervised by an area coordinator. The master's program consists of 30 credits. Students should consult with the area coordinator or designee for their area of specialization before registering for courses to make sure they are meeting department requirements. Area coordinators or their designees must approve any additional courses that students wish to be counted towards their degrees. As a requirement for graduation, students must achieve a 3.0 cumulative GPA overall and in graduate-level courses not including the master's thesis or project.

3. Project, Thesis, Seminar

Students who enter the electrical engineering master's program and who receive departmental or research-based awards must complete a master's thesis.

All master's students are encouraged to register for two semesters of ECE 791 Graduate Seminar. But it is not mandatory. Those with substantial professional experience may have this requirement waived. In order to receive passing credit, the student must attend at least five (5) seminars per semester for two semesters, to be chosen from those sponsored by the areas, the ECE department, the Institute, or other outside seminars approved by the Seminar Supervisor. Please watch the bulletin board labeled *ECE 791 Graduate Seminar*, located in the hall leading to the ECE main office, for information on approved seminars.

Students who enter the program but who did not receive departmental or research-based awards, as well as entering part-time students, have three program options: 24 course credits and 6 credits of ECE 701 Master's Thesis or 27 course credits and 3 credits of ECE 700 Master's Project or 30 course credits not to include ECE 700 Master's Project or ECE 701 Master's Thesis.

4. Areas of Specialization

Entering full-time students must select an area of specialization during their first semester. Entering part-time students must select an area of specialization by the beginning of their second semester. Further Students should contact the MSEE Graduate Advisor for guidance.

Research Area Members

Communications, Signal Processing and Microwaves

Dr. Ali Abdi
Dr. Ali Akansu
Dr. Nirwan Ansari
Dr. Hongya Ge
Dr. Haim Grebel
Dr. Alexander Haimovich
Dr. Moshe Kam
Dr. Joerg Kliewer
Dr. Xuan Liu
Dr. Edip Niver
Dr. Yun-Qing Shi
Dr. Osvaldo Simeone
Dr. Cong Wang
Dr. Gerald Whitman

Computer Architecture and Systems

Dr. John Carpinelli
Dr. Edwin Sui-Hoi Hou
Dr. Abdallah Khreishah
Dr. Qing Gary Liu
Dr. Durgamadhab Misra
Dr. Bipin Rajendran
Dr. Roberto Rojas-Cessa
Dr. Jacob Savir
Dr. Sotirios Ziavras

Computer Networking

Dr. Ali Akansu
Dr. Nirwan Ansari
Dr. Edwin Sui-Hoi Hou
Dr. Abdallah Khreishah
Dr. Qing Gary Liu
Dr. Roberto Rojas-Cessa
Dr. MengChu Zhou

Electronic and Photonic Devices

Dr. Haim Grebel
Dr. Dong-Kyun Ko
Dr. Durgamadhab Misra
Dr. Hieu Nguyen
Dr. Bipin Rajendran
Dr. Marek Sosnowski
Dr. Leonid Tsybeskov

Intelligent Systems

Dr. Atam Dhawan
Dr. Bernard Friedland
Dr. Walid Hubbi
Dr. D.K. Ko
Dr. H.P. Nguyen
Dr. Yun-Qing Shi
Dr. Cong Wang
Dr. MengChu Zhou

5. Program Core Requirements

Students are required to take the following core courses :

- ECE 601-Linear Systems (all areas of specialization except Computer Systems)
- Choose at least one out of {ECE 620-Electromagnetic Field Theory, or ECE 673-Random Signal Analysis}

6. 500-Level Courses

500-level courses in electrical engineering are not acceptable for credit toward a degree in electrical engineering. 500-level course outside the department may not be applied for credit toward a degree in electrical engineering.

7. Area Requirements

A minimum of 24 credits should be from ECE Department. Students may take up to two courses outside the ECE Department with advisor approval. In addition, every student needs to register ECE 791 for two semesters. Note that elective courses are amended periodically, and students can choose electives outside of the lists below with advisor approval.

COMMUNICATIONS, SIGNAL PROCESSING, AND MICROWAVES

Area Requirements (choose at least two):
ECE 642-Communication Systems I
ECE 742-Communication Systems II
ECE 640-Digital Signal Processing
ECE 740-Advanced Digital Signal Processing
ECE 630-Microwave Electronic Systems
ECE 632-Antenna Theory

Suggested Electrical Engineering Electives:
ECE 609-Artificial Neural Networks
ECE 622-Wave Propagation
ECE 623-Fourier Optics
ECE 625-Fiber and Integrated Optics
ECE 626-Optoelectronics
ECE 643-Digital Image Processing I
ECE 644-Intro. to Wireless & Personal Comm. Systs.
ECE 684-Advanced Microprocessor Systems
ECE 746-Adaptive Array Proc. and Interference Canc.
ECE 747-Signal Decomposition Techniques
ECE 749-Compression in Multimedia Engr.
ECE 755-Advanced Topics in Digital Communication
ECE 757-Wireless Communication
ECE 776-Information Theory
ECE 777-Statistical DeCSion Theory in Communications
ECE 778-Algebraic Coding for Info. Transmission

Firmware Engineering track: ECE640 & ECE641 & ECE689

COMPUTER NETWORKING

Area Requirements:
ECE 683-Computer Network Design and Analysis
ECE 783-Computer Communication Networks

Suggested Electrical Engineering Electives:
ECE 605-Discrete Event Dynamic Systems
ECE 637-Introduction to Internet Engineering
ECE 638-Network Management and Security
ECE 639-Principles of Broadband ISDN and ATM
ECE 642-Communication Systems I
ECE 644-Intro. to Wireless & Personal Comm. Systems
ECE 645-Wireless Networks
ECE 658- VLSI Design
ECE 677-Optimization Techniques
ECE 681-Broadband Packet Switches
ECE 690-Computer Systems Architecture
ECE 742-Communications Systems II
ECE 745- Advanced Wireless Networks
ECE 785-Parallel Processing Systems
ECE 685-Network Interface Design
CS 610- Data Structures and Algorithms
CS 665-Algorithmic Graph Theory
Math 661-Applied Statistics
Mgmt 685-Operations Research and Decision Making

COMPUTER ARCHITECTURE AND SYSTEMS

Area Requirements:
ECE 689-Dig. Sys. Design for Machine Arith.
ECE 690-Computer Systems Architecture

Electrical Engineering Electives:
ECE 605-Discrete Event Dynamic Systems
ECE 612-Computer Methods Applied to Power Systems
ECE 640-Digital Signal Processing
ECE 643-Digital Image Processing I
ECE 650-Electronic Circuits
ECE 660-Control Systems I
ECE 664-Real-Time Computer Control Systems
ECE 684-Advanced Microprocessor Systems
ECE 686-Instrumentation Systems and Microprocessors
ECE 687-Design of Medical Instrumentation
ECE 688-Microcontrollers in Instrumentation
ECE 785-Parallel Process Systems

INTELLIGENT SYSTEMS

Area Requirements (choose at least 2):
ECE 605-Discrete Event Dynamic Systems
ECE 788-Computational intelligence
ECE 610-Power System Steady-State Analysis
ECE 660-Control Systems I

Suggested Electrical Engineering Electives:
ECE 611-Transients in Power Systems
ECE 612-Computer Methods Applied to Power Systems
ECE 613-Protection of Power Systems
ECE 614-Dynamics of Electromechanical Energy Conversion
ECE 615-Advanced Electromechanical Energy Conversion I
ECE 616-Power Electronics
ECE 640-Digital Signal Processing
ECE 664-Real-Time Computer Control Systems
ECE 666-Control Systems II
ECE 661-Control System Components
ECE 677-Optimization Techniques
ECE 684-Advanced Microprocessor Systems
ECE 766-Stability Theory of Nonlinear Systems
ECE 768-Optimal Control Theory
ECE 769-Stochastic Estimation and Control
CS 670-Artificial Intelligence
CS 672-Expert System Methods and Design

ELECTRONIC AND PHOTONIC DEVICES

Area Requirements (choose at least two):
ECE 622-Wave Propagation
ECE 626-Optoelectronics
ECE 650-Electronic Circuits
ECE 657-Semiconductor Devices
ECE 658-VLSI Design I
ECE 758-VLSI Design II

Suggested Electrical Engineering Electives:
ECE 605-Discrete Event Dynamic Systems
ECE 623-Fourier Optics
ECE 624-Optical Engineering
ECE 625-Fiber and Integrated Optics
ECE 630-Microwave Electronic Systems
ECE 648-Digital Microelectronics
ECE 659-Fabric.Prin.Elec./Optoelec. Devices
ECE 660-Control Systems I
ECE 677-Optimization Techniques
ECE 684-Advanced Microprocessor Systems
ECE 690-Computer Systems Architecture
ECE 730-Theory of Guided Waves
ECE 739-Laser Systems
ECE 756-Semiconductor Devices II
ECE 785-Parallel Processing Systems
ECE 789-Design for Testability Principle
ECE 677-Optimization Techniques
ECE 768-Optimal Control Theory
Phys 761/787*-Phys. of Sensors & Actuators
MtSE 702-Characterization of Solids
MtSE 650-Physical Metallurgy
MtSE 765-Sci. and Technology of Thin Film

8. Independent Study

For Master's students, independent study courses, ECE 725, ECE 726, and ECE 727 will not count towards the Master's degree course requirement, but ECE 725 can be used to satisfy the 12-credit full-time requirement. ECE 726 and ECE 727 cannot be used to satisfy the 12-credit full-time requirement.

9. Master's Thesis

Before the end of the final term of thesis registration, a Master's Thesis Committee, consisting of three (3) faculty members, will hear the student present his or her thesis in an open forum (thesis defense). At least two (2) members of the committee must be members of the ECE department. A typed version of the completed thesis should be available to the committee at least three (3) weeks before the oral defense is scheduled and an unbound copy of the thesis should be available in the Department Secretary's office (235 ECEC) three weeks before the defense. The final version is due in the library to meet graduation requirements by the date specified by the Office of Graduate Studies. Written notice of the presentation will be posted. Interested faculty and graduate students are invited to attend.

V. MASTER OF SCIENCE IN COMPUTER ENGINEERING

1. Admission Requirements

Students are expected to have an undergraduate education in engineering or computer science. Students with baccalaureate degrees in areas other than computer engineering will be required to complete a bridge program. Those with undergraduate degrees in other fields should consult the Director of Computer Engineering for bridge requirements. Bridge courses do not count toward degree requirements.

2. Degree Requirements

Students must complete 30 credits—at least half of which are offered through the Department of Electrical and Computer Engineering—including the two-course sequence in at least one of the five areas of concentration. Students in all areas must take the two required core courses indicated below and complete either a master's project or thesis. As a requirement for graduation, students must achieve a 3.0 cumulative GPA, not including the master's thesis or project. The master's thesis or project grade must be B or higher.

Students who enter the computer engineering master's program and who receive departmental or research-based awards must complete a master's thesis.

All master's students are encouraged to register for two semesters of ECE 791 Graduate Seminar. But it is not mandatory. Those with substantial professional experience may have this requirement waived. In order to receive passing credit, the student must attend at least five (5) seminars per semester, to be chosen from those sponsored by the areas, the ECE department, the Institute, or other outside seminars approved by the Seminar Supervisor. Please watch the bulletin board labeled *ECE 791 Graduate Seminar*, located in the hall leading to the ECE main office, for information on approved seminars.

PLEASE NOTE THAT ECE 684 IS NOT AVAILABLE FOR MSCoE CREDIT.

3. Core

Required for all specializations are ECE 690-Computer Systems Architecture and CS 610-Data Structures and Algorithms, *and* a project or thesis (3 credits of ECE 700-Master's Project or 6 credits of ECE 701-Master's Thesis).

4. Area Requirements

Computer Architecture and Embedded Systems

Required:
ECE 658-VLSI Design I
ECE 692- Embedded Computing Systems

Electives:
ECE 605-Discrete Event Dynamic Systems
ECE 648-Digital Microelectronics
ECE 650-Electronic Circuits
ECE 657-Semiconductor Devices
ECE 683-Computer Network Design and Analysis
ECE 685-Network Interface Design
ECE 689-Digital Sys. Design for Machine Arithmetic
ECE 758-VLSI Design II
ECE 785-Parallel Processing Systems
ECE 789-112: Design for Testability Principles
CS 630-Operating System Design
CS 633-Distributed Systems
CS 636-Compiling System Design
CS 641-Formal Languages and Automata
CS 661-Systems Simulation
CS 665-Algorithmic Graph Theory
CS 668-Parallel Algorithms

Intelligent Systems

Required:
ECE 605-Discrete Event Dynamic Systems
ECE 788-Computational intelligence

Electives:
ECE 610-Power System Steady-State Analysis
ECE 611-Transients in Power Systems
ECE 613-Protection of Power Systems
ECE 616-Power Electronics
ECE 640-Digital Signal Processing
ECE 660-Control Systems I
ECE 664-Real-Time Computer Control Systems
ECE 666-Control Systems II
ECE 661-Control System Components
ECE 677-Optimization Techniques
ECE 684-Advanced Microprocessor Systems
CS 630-Operating System Design
CS 634-Data Mining
CS 670-Artificial Intelligence
CS 672-Expert System Methods and Design
CS 675-Machine Learning

Computer Networking

Required:
ECE 683-Computer Network Design and Analysis
ECE 637-Introduction to Internet Engineering

Electives (15 to 18 credits):
ECE 605-Discrete Event Dynamic Systems
ECE 636-Computer Networking Laboratory
ECE 639-Principles of Broadband Networks
ECE 642-Communication Systems I
ECE 644-Intro. Wireless and Personal Comm. Systs.
ECE 673-Random Signal Analysis
ECE 677-Optimization Techniques
ECE 681-Broadband Packet Switches
ECE 685-Network Interface Design
ECE 742-Communication Systems II
ECE 783-Computer Communication Networks
CS 630-Operating System Design
CS 631-Data Management System Design
CS 633-Distributed Systems

VLSI System Design

Required:
ECE 658-VLSI Design I
ECE 758-VLSI Design II

Electives (15 to 18 credits):
ECE 605-Discrete Event Dynamic Systems
ECE 683-Computer Network Design and Analysis
ECE 650-Electronic Circuits
ECE 657-Semiconductor Devices
ECE 659-Fabric.Prin. Elec./Optoelec. Devices
ECE 783-Computer Comm. Networks
ECE 789-Design for Testability Principles
CS 630-Operating System Design
CS 631-Data Management System Design
CS 641-Formal Languages and Automata
CS 665-Algorithmic Graph Theory
IE 605-Engineering Reliability

Other courses may be used as electives with the permission of MS CoE Program Advisor.

5. Master's Thesis

Before the end of the final term of thesis registration, a master's thesis committee, consisting of three (3) faculty members, will hear the student present his or her thesis in an open forum (thesis defense). At least two (2) members of the committee must be members of the ECE department. A typed version of the completed thesis should be available to the committee at least three (3) weeks before the oral defense is scheduled and an unbound copy of the thesis should be available in the Department Secretary's office (235 ECEC) three weeks before the defense. The final version is due in the library to meet graduation requirements by the date specified by the Office of Graduate Studies. Written notice of the presentation will be posted. Interested faculty and graduate students are invited to attend.

6. Research Opportunities

Computer engineering faculty research areas include

Computer networking
Multiprocessor system architecture
Parallel and distributed processing
Scheduling
Image processing
Neural networks and genetic algorithms
Infrared imaging
Discrete event system models and tools
Big data analytics
Computer embedded control
Robotics and intelligent automation
VLSI design and micro-engineering
Computer-aided instruction
Fault-tolerant computing
Digital testability
Computer-aided design
Internet of Things
Intelligent transportation systems

VI. MASTER OF SCIENCE IN INTERNET ENGINEERING

The Internet has become an economic reality, which spans almost all sectors of the society. Its next generation is expected to impact the lives of even more people than it does today. The vision, design, implementation and development of this evolving communications infrastructure require a new type of technical workforce with a solid background in engineering, computing, management and entrepreneurship. The proposed MS program is complementary to the existing MS programs in Electrical Engineering, Computer Engineering, Computer Science, Information Systems and Telecommunications. The explosive growth in Internet and multimedia technologies demands engineering skills that entail internet working analysis, design and applications. These competencies cannot be learned through graduate degree programs available today. This program aims to produce engineers who understand the fundamentals of computer internet working and relevant emerging applications. The required courses provide the basics of Internet Engineering to students, who can, in turn, choose electives from the available course pool to tailor the program to their professional needs and interests. This program utilizes graduate courses in Electrical and Computer Engineering, Computer and Information Science, Management Information Systems, and Management Programs at NJIT to provide the necessary blend of education required for strength in Internet Engineering.

Admission Requirements

Applicants should have an undergraduate degree in Computer Engineering, Electrical Engineering or other relevant discipline from an accredited institution (or its equivalent). A minimum GPA of 3.0 on a 4.0 scale is required. These students should have taken EE321 (Random Signal and Noise), or another equivalent course; EE333 (Signals and Systems); and CS 112 (Introduction to Computing or equivalent proficiency in C++ programming).
Bridge Program – The curriculum requires a basic knowledge of computer and communications fundamentals, such as signals and systems (EE 333), basic communication systems (EE 481), programming (CS 112 or C++ programming), data structures and algorithms (CS 505), and computer organization (CoE 251). The bridge courses are usually selected from this list, but some additional bridge courses, appropriate to each student's background, may be required.

Degree Requirements

Candidates must complete a minimum of 30 credits, 9 in core courses and 21 in elective courses.
The required courses provide the basics of Internet Engineering. Electives are to be chosen from the available course pool to tailor the program to the student's professional needs and interests. This program utilizes graduate courses in Electrical and Computer Engineering, Computer and Information Science, Management Information Systems, and Management Programs at NJIT. They provide the necessary blend of education required for appropriate strength in Internet Engineering.

Core Courses (9 Credits):

ECE 637 Introduction to Internet Engineering
ECE 683 Computer Network Design and Analysis
CS 602 Java Programming

Electives (21 Credits)[†]:

Select 15 credits if completing a master's thesis; 18 credits if completing a master's project; 21 credits if not completing either a master's project or a thesis.

[†] Other (new) courses related to Internet Engineering may be selected as electives with approval from the Graduate Advisor.

ECE 636	Computer Networking Laboratory
ECE 638	Security & Network Management
ECE 639	Principles of Broadband Networks
ECE 649	Compression in Multimedia Engineering
ECE 645	Wireless Networks
ECE 673	Random Signal Analysis
ECE 681	Broadband Packet Switches
ECE 685	Computer Network Interface Design
ECE 783	Computer Communication Networks
ECE 745	Wireless Internet
ECE 738	Communications Network Routing
ECE 788	Selected Topics in Internet Engineering
CS 604	Client/Server Computing
Mgmt 620	Management of Technology
MIS 625	Internet for Managers
MIS 636	Telecommunications: Policies & Regulations

Student may take other courses from the Department of Electrical and Computer Engineering or other departments at NJIT not listed here but they must be approved by the Graduate Advisor prior to registration.

Project, Thesis (optional)

ECE 700	Master's Project in Internet Engineering (3 Credits)
ECE 701	Master's Thesis in Internet Engineering (6 Credits)

VII. MASTER OF SCIENCE IN TELECOMMUNICATIONS

Telecommunications is one of the most rapidly growing fields in Engineering. Telecommunication specialization is becoming necessary in such diverse fields as banking, smart grids, office information systems, corporate networks, the Internet, etc. Recent challenges like gigabit optical networks, multimedia communications, and wireless network access, make the future of the field very exciting. The objective of this program is to educate individuals in one or more of these telecommunication specializations.

The MS in Telecommunications differs from any existing MS degree at NJIT. It is aimed at professionals holding bachelors' degrees in computer science, computer engineering, or electrical engineering. The Telecommunications program is based on a synergistic blending of existing ECE and CS courses specially created to serve this program. It has a technical/scientific focus with a rich selection of electives and specializations.

Admission Requirements

Students can apply for admission to the program through either the Department of Electrical and Computer Engineering or the Department of Computer and Information Science. All applicants must submit scores on the Graduate Record Examinations (GRE) verbal, quantitative, and analytical aptitude tests. Applicants with undergraduate degrees in computer science, computer engineering or electrical engineering from an accredited institution are expected to have a GPA of at least 3.0. It is expected that these students have taken CS 333, EE 321 and EE 333 (or their equivalents).

Bridge Program~ Applicants having degrees in other related fields will be considered for admission on an individual basis. These students may be required to complete a bridge program. The curriculum for the M.S. in Telecommunications requires a basic knowledge of computer fundamentals such as programming, data structures, computer architecture, signals and systems, and basic communication systems. Bridge courses do not count toward the degree. Completion of the preparatory courses with a 3.0 cumulative GPA or better is required for transfer to matriculated status. The bridge courses are selected from the following list depending on individual background.

ECE 321 Random Signals and Noise*
ECE 333 Circuits and Systems III*
ECE 481 Communications Systems
CS 251/EE 352/CoE 353-Computer Organization/Architecture/Microprocessors
CS 332 Operating Systems
CS 333 UNIX Operating Systems
CS 505 C++ Data Structures

* ECE 321 and ECE 333 may be substituted with ECE 501, Linear Systems and Random Signals.

Degree Requirements

Candidates must complete a minimum of 30 credit hours of course work, with a minimum overall average of 3.0. In addition, a minimum 3.0 GPA is required in the four (4) core courses indicated below. Students with an exceptionally strong telecommunications background may be allowed to replace required courses with advanced electives. Permission of the Graduate Advisor from the Department of Electrical and Computer Engineering or the Department of Computer and Information Science is required.

Core Courses (12 credit hours):
ECE 642 Communication Systems I
ECE 644 Introduction to Wireless and Personal Communications Systems
ECE 683/CS652-Comp. Network Design & Analysis or CS652- Comp. Network-Arch. Protocol Standards
ECE673 Random Signal Analysis I

Elective Courses (18 credit hours):
ECE 637/CIS 656 Internet and Higher Layer Protocols
ECE 638/CIS 696 Networks Management and Security
ECE 639/CIS 697 Principles of Broadband ISDN and ATM
ECE 646 Introduction to Data Communication
ECE 649 Compression in Multimedia Engineering or CIS 658 Multimedia Systems
ECE 681 High Performance Switches and Routers
ECE 690 Computer Systems Architecture or CIS 650 Computer Architecture
ECE/CS 701 Thesis in Telecommunications (6 cr.) or ECE/CS 700 Project in Telecommunications (3 cr.)
ECE 742 Communication Systems II
ECE 755 Digital Communications
ECE 757 Wireless Communications
ECE 783 Computer Communication Networks
ECE 785 Parallel Processing Systems
CS 604 Introduction to Client-Server Computing
CS 630 Advanced Operating System Design
CS 631 Data Management System Design I
CS 633 Distributed Systems
CS 637 Real-Time Systems
CS 654 Telecommunication Networks Performance Analysis
CS 665 Algorithmic Graph Theory
CS 668 Parallel Algorithms
CS 679 Management of Computer and Information Systems
CS 752 Communication Protocol Synthesis and Analysis
MIS 635 Management of Telecommunications
MIS 636 Telecommunications: Policies and Regulation

Any course not listed here must be approved by the Graduate Advisor.

Areas of Specialization
The following are examples of suggested areas of specialization. They are given to provide a general framework for students.

Management and Administration:	ECE 638/CS 696-Networks Management and Security CS 679-Management of Computer and Information Systems MIS 635-Management of Telecommunications MIS 636-Telecommunications: Policies and Regulation

Communication Systems:	ECE 639/CS 697-Principles of Broadband ISDN and ATM ECE 646-Introduction to Data Communication ECE 649-Compression in Multimedia Engineering *or* CS 658-Multimedia Systems ECE 673-Random Signal Analysis I ECE 685-Network Interface Design ECE 742-Communications Systems II ECE 755-Digital Communications ECE 757-Wireless Communications
Networking:	ECE 638/CS 696-Networks Management and Security ECE 639/CS 697-Principles of Broadband ISDN and ATM ECE 673-Random Signal Analysis ECE 783-Computer Communication Networks CS 604-Introduction to Client-Server Computing CS 633-Distributed Systems CS 637-Real-Time Systems CS 650-Computer Architecture *or* ECE 690-Computer Sys. Architecture CS 654-Telecommunication Networks Performance Analysis CS 656-Internetworking and Higher Layer Protocols CS 665-Algorithmic Graph Theory
Information:	CS 604-Introduction to Client-Server Computing CS 631-Data Management Systems Design CS 658-Multimedia Systems *or* ECE 649-Compression in Multimedia Engineering CS 696/ECE 638-Networks Management and Security

Other ECE/CS courses related to telecommunications may be selected as electives with written approval from the appropriate department Graduate Advisor.

VIII. M.S. IN POWER AND ENERGY SYSTEMS

Academic Advisor: MengChu Zhou, Ph.D. and Distinguished Professor

Degree Requirements

Bridge Program: Students who have earned a Bachelor of Science in Engineering Technology (B.S.E.T.) degree, or who lack an appropriate background may be admitted and be required to take selected courses in addition to the degree requirements in order to make up deficiencies. They must attain a grade of B or better in each course. At the discretion of the department, students who have taken courses equivalent to these may have their bridge programs reduced accordingly. This master's program consists of 30 credits. As a requirement for graduation, students must achieve a 3.0 cumulative GPA in graduate-level courses, not including the master's thesis or project. The project grade must be B or better.

Bridge Courses	
ECE 321	Random Signals and Noise
ECE 232	Circuits and Systems II
ECE 333	Signals and Systems
ECE 341	Energy Conversion
ECE 361	Electromagnetic Fields I
ECE 372	Electronic Circuits II
Total Credits	
Core Courses	
ECE 601	Linear Systems
ECE 610	Power System Steady-State Analysis
Specialized Courses/Electives	
Select three (or more) of the following:	
ECE 611	Transients in Power Systems
ECE 616	Power Electronics
ECE 618	Renewable Energy Systems
ECE 698	Selected Topics in Electrical and Computer Engineering
MGMT 620	Management of Technology
Electives	
ECE 613	Protection of Power Systems
ECE 617	Economic Control of Interconnected Power Systems
ECE 698	Special Topics: Power Generation and Distribution Systems
ECE 698	Special Topics: Environmental & Regulatory Issues in Power & Utility Industry
ECE 605	Discrete Event Dynamic Systems
ECE 637	Internet and Higher-Layer Protocols
ECE 673	Random Signal Analysis
ECE 661	Control System Components
ECE 664	Real-Time Computer Control Systems
ME 607	Advanced Thermodynamics
ME 610	Applied Heat Transfer
EnE 671	Environmental Impact Analysis
IE614	Safety Engineering Methods

ARCH 665	Substainable Design of Energy Efficient Building
Other Electives	Upon the approval of the Advisor of the MS in PES program
	Note: Some courses may need proper pre-requisites. Please consult with the instructor and advisor.

If you do a Master's Project, you need to take in total 9 courses; and if you do a Mater's thesis, you need to take 8 courses. These options are highly recommended if you like research and plan to pursue for your Ph.D. degree.

IX. DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING

This program is intended for superior students with Master's or Bachelor's degrees in electrical engineering, computer engineering, computer science, or other related fields, who wish to pursue advanced research in electrical engineering.

During the first year of doctoral study, students should seek an academic faculty advisor in their area of concentration to advise on their program of study, including course registration and preparation for the qualifying examination. Students should also speak to area faculty to choose a research advisor and the research topic they will begin after passing the qualifying examination. The academic advisor and the research advisor could be the same person. Students can always visit the Associate Chair for Graduate Studies to discuss any issues regarding their program.

1. Degree Requirements

A program of study is determined in consultation with a department advisor. The student is required to pass a qualifying examination. Ph.D. students with a recognized Master's degree or equivalent are required to take four 700-level 3-credit courses (12 credits). Ph.D. students with a recognized Baccalaureate degree are required to take eight 600-level or 700-level 3-credit courses (24 credits) of coursework beyond the Baccalaureate degree as well as four additional 700-level 3-credit courses (12 credits), for a total of twelve 3-credit courses (36 credits). Master's project (course 700), Master's thesis (course 701), or more than two independent study courses (courses 725 and 726) cannot be used to satisfy these coursework requirements. A Ph.D. student may substitute a 600-level course for a 700-level course only after the academic advisor appeals on behalf of the student to the Office of Graduate Studies and receives approval. A Ph.D. program may define an additional set of required courses that must be pre-approved by the academic college (multiple colleges may be involved for interdisciplinary programs). Whether or not a program requires additional courses above the aforementioned minimum requirements, a Ph.D. student's dissertation committee may ask the student to take additional courses.

Ph.D. Dissertation Registration Requirements:

- Ph.D. students who pass the Qualifying Examination (QE) must then register for 3 credits of pre-doctoral research (792B) per semester until they defend successfully the dissertation proposal.
- Ph.D. students who defend the dissertation proposal successfully must then register for the 1-credit dissertation course (790A) each semester until they complete all degree requirements.
- Students may take courses simultaneously with the 790 or 792 course as per Ph.D. program guidelines or dissertation committee recommendation.
- Students who do not meet the following deadlines will be dismissed from the Ph.D. program.
- The required coursework for the Ph.D. program and the (major part of the) QE must be completed successfully by the end of the second year in the program.
- The dissertation proposal must be defended successfully either by the end of the third year in the Ph.D. program or four semesters after registering for the first time in the 792 pre-doctoral research course, whichever occurs earlier.
- The dissertation must be defended successfully by the end of the sixth year in the Ph.D. program.

- All doctoral students must register for six semesters of ECE 791 Graduate Seminar. In order to receive passing credit, the student must attend at least five (5) seminars per semester, to be chosen from those

sponsored by the areas, the ECE department, the Institute, or other outside seminars approved by the Seminar Supervisor. Please watch the bulletin board labeled *ECE 791 Graduate Seminar*, located in the hall leading to the ECE main office, for information on approved seminars.

- Students who wish to change majors may do so only once. If students receiving ECE department financial support wish to change majors, their applications for financial aid will be re-evaluated, at the time of switching, as if they were new applicants.

B.S. to Ph.D. Program

Superior undergraduate students may apply to be admitted directly into the Ph.D. program. Such an accelerated program requires a minimum entrance GPA of 3.5, plus an interview with the ECE department Graduate Studies Committee.

2. Qualifying Examination

Goal: ECE Department's qualifying exam needs to be a constructive component in the development of a student's research skills and use the course work requirements to identify potential doctoral students.

Exam Structure: The Ph. D. Qualifying Exam has two parts: I) GPA requirement on selected courses, and II) Research potential assessment.

Part I. GPA Course Requirements:

ECE Course Requirement: Prequalified doctoral students are required to pass four courses selected from a list of relevant doctoral courses ("core courses") with a GPA of at least 3.5 or higher.

Each research group (Communications, Signal Processing and Microwave; Computer Networking; Computer Architecture, Electronic and Photonic Devices; and Intelligent Systems) has its own list of courses. Courses are listed at the bottom of this section.

Part II. Research Potential Assessment Oral Qualifier:
The research potential assessment oral qualifying examination must be taken within the first year from the time the student starts the Ph.D. program if he/she has a MS degree. In the case of a student accepted into the BS-Ph.D. track, the exam must be taken within two years from the time the student starts the Ph.D. program. For the students accepted with a MS degree, within the first two semesters from the time the student starts the Ph.D. program the student must complete one Independent Research course in his/her research area of interest. For the Independent Research course, the student registers with a faculty member who may or may not be the student's prospective Ph.D. advisor.

The oral exam committee will be assigned by the Associate Chair for Graduate Studies of the ECE Department. It will be chaired by a faculty member from an area different from the student's area of interest. In addition to the Chair, the committee will include three faculty members in the student's area of interest. The supervisor of the independent research work or the student's prospective advisor may be part of the committee.

A student must send in an official application for taking the oral Qualifying exam to the Associate Chair for Graduate Studies, at least one month before the target date of the oral exam committee. The student is

responsible to find a time such that all committee members can attend. In the application, the student should identify the research focus area for the exam and outline how the course requirements (if any) for that focus area have been met.

For the oral exam, the student will prepare a written report to the committee and to the associate chair for graduate studies at least one week before the exam date. The report should be written following the standard format of a conference paper, with 4-6 pages in double column, font size 11. The subject of the oral exam is to be chosen by the student. It is recommended that this choice be made in consultation with a faculty advisor and the ECE associate chair for graduate studies. A suitable basis for the examination may include, but is not restricted to:

- A paper/report (conference, journal, technical report, patent, and/or published or submitted)
- A conference paper submission based on research under the supervision of a faculty advisor.
- An M.S. thesis in preparation or previously completed thesis
- A final project report derived from an ECE Independent Study course.

During the exam the student will make a 30-minute oral presentation of his/her own independent research to the oral exam committee.

The oral presentation will be followed by an open-ended question and answer session that may include questions specific to the research project as well as questions generally relevant to the research area regarding fundamental knowledge underpinning the project topic. In addition, basic questions from various different areas can be asked to determine student's breadth of understanding.

Since this examination will occur in the early stages of research, and since the oral exam is not a doctoral defense, the presented paper need not lead to a Ph.D. thesis proposal. For the examination committee, evaluation of the originality and novelty of the research contribution will be secondary to an evaluation of the student's critical thinking skills. Specifically, the committee will focus on the student's ability to analyze, interpret and articulate both strengths and weaknesses of the work. Outstanding students, who have published several papers prior to starting their Ph.D. program, are encouraged to take the oral qualifying exam during the first semester of the Ph.D. program.

The committee will provide a written evaluation of the student's potential for Ph.D. research (in terms of technical ability, and oral and written communications skill) to the department. The committee members can seek input from the prospective Ph.D. advisor when making such evaluation, but the advisor is excluded from participating in formulating the written evaluation. Each member of the Ph. D. Qualifying committee votes to pass or fail the student. The written report should include the vote. The vote of 3:1 or 4:0 is needed for the student to pass the Ph.D. Qualifying Exam.

The ECE department will make the final decision of pass or fail based on the exam committee's report. The student will be allowed two chances to take the Ph.D. Qualifying Exam. The second attempt must be taken within six months from the time the student made the first qualifying exam. Failure to do so will automatically dismiss the student's qualification for further doctoral study.

The Ph. D. Qualifying Exam is offered year around. Five Areas of the Ph. D. Qualifying Exam

- Communications, Signal Processing and Microwave
- Computer Networking
- Computer Architecture
- Electronic and Photonic Devices
- Intelligent Systems

The student needs to select a minimum of 4 courses out of 6 courses required by each area: Students can take additional courses as per the advisement of area. Here are the suggested courses for different areas:

Communication	**Signal Processing**	**Microwave**	**Networking**	**Computer Architecture**	**Electronic & Photonic**	**Intelligent Systems**
ECE 725	ECE 725	ECE 725	ECE 725	ECE 725	ECE 725	ECE 725
ECE 726	ECE 726	ECE 726	ECE 726	ECE 726	ECE 726	ECE 726
ECE 742	ECE 740	ECE 742	ECE 783	ECE 690	ECE 758	ECE 609
ECE 744	ECE 743	ECE 630	ECE 681	ECE 758	ECE 657	ECE 666
ECE 776	ECE 788	ECE 632	ECE 744	ECE 692	ECE 756	ECE 605
ECE 777	ECE 777	ECE 744	ECE 639	ECE 689	ECE 618	ECE 618

3. Doctoral Candidacy

Students become doctoral candidates when they pass the qualifying examination. Status as a doctoral candidate does not imply candidacy for the degree. Registration for doctoral research is permitted only to doctoral candidates.

4. Dissertation Committee

A dissertation committee must be formed within twelve months after passing the qualifying examination. The dissertation committee must be approved by the ECE Department Graduate Affairs Committee at the time of its formation and before the presentation of the research proposal. The dissertation committee chairperson typically is the doctoral candidate's program advisor, but other faculty may be selected, provided that they are from the ECE Department. The committee consists of a minimum of five members, one of whom is external to the ECE Department or to NJIT, and at least three of whom are members of the ECE department. The dissertation advisor must be a tenure-track or tenured faculty member at NJIT. If the dissertation advisor is an ECE department faculty member, then the chair of the student's dissertation committee may be any tenure-track or tenured faculty member in the ECE Department at NJIT. If the dissertation advisor is not a member of the ECE department at NJIT, then the chair of the student's dissertation committee must be a tenured faculty member in the ECE department at NJIT. If the dissertation advisor is not an ECE department faculty member, there must be a co-advisor who is a tenure-track or tenured faculty member in the ECE department at NJIT.

5. Research Proposal

Doctoral candidates must prepare a written research proposal for approval by their dissertation committee. The proposal must be presented after formation of the committee but within twelve months after passing the qualifying exam. The proposal should show that facilities are available to do the work. Research is expected to investigate or develop a unique contribution to science and technology. Research may be experimental, analytical, applied, or theoretical, provided it satisfies these criteria and is approved by the dissertation committee. The research proposal would normally include title and goal of the proposed dissertation; a detailed discussion of background material, including a literature search; a summary of

work accomplished to date; a statement of how the residency requirement will be met; and a proposed time table for completion of research.

6. Residency

Doctoral candidates must spend at least one academic year in full-time residence (defined as full-time registration for two consecutive semesters). This requirement is sometimes waived with the approval of the dissertation committee and the Office of Graduate Studies. Such waivers are granted when a candidate's dissertation research requires use of research facilities at an approved off-campus site.

7. Dissertation and Defense

A dissertation should demonstrate original research that contributes to knowledge in the field. The dissertation should result in scholarly publication and must be defended in a publicly-announced oral defense. A typed version of the completed dissertation should be available to the committee at least three (3) weeks before the oral defense is scheduled and an unbound copy of the thesis should be available in the Department Secretary's office (235 ECEC) three weeks before the defense. Successful defense of the dissertation is determined by vote of the dissertation committee. All members of the committee must be present to hear the defense. In regard to format, the standard reference is the latest edition of the Estrin/Roche manual *Guidelines for Scientific and Professional Theses*. The Office of Graduate Studies policies on number of copies, deadlines, and submission of dissertation and abstracts are also to be followed. Every member of the dissertation committee must sign the approval page of the final dissertation document. Students cannot be certified by the ECE department for the doctoral degree until the student publishes **at least one paper in a peer-reviewed journal** deemed of acceptable quality by the dissertation advisor.

8. Grade Point Average

In order to obtain the Doctor of Philosophy degree, candidates must achieve a cumulative grade point average of at least 3.5 in all graduate courses. The 3.5 minimum does not include the grade assigned for completion of the doctoral dissertation. Completion of the dissertation and its defense will be assigned a grade of P for "Passing." The P grade is for dissertation credits taken in the student's final semester.

9. ECE Department Financial Support for Doctoral Students

Doctoral students who are receiving financial support (GA or TA) from the ECE department must adhere to the following policies.

At the completion of the first year of support, the student must submit a progress report to the ECE department Doctoral Studies Committee indicating progress in courses, research, and qualifying examinations. In addition, the student's dissertation advisor must write a request for continued financial support.

Support for the second year is contingent upon passing the requirements for qualifying exams. Support after the second year is not guaranteed and is typically depends on the student's adviser. Ay department support is contingent upon satisfying the requirements for committee formation, and proposal presentation as defined on pages 26 and 27 of this document.

Students who wish to apply for financial aid must be recommended by a faculty member who will submit a letter to the chair of the ECE Graduate Affairs Committee on behalf of the doctoral student. Preference is given to students who have passed the qualifying examination.

X. DOCTOR OF PHILOSOPHY IN COMPUTER ENGINEERING

This program is intended for superior students withMaster's or Bachelor's degrees in computer engineering, computer science, electrical engineering, or other related fields, who wish to pursue advanced research in computer engineering.

During the first year of doctoral study, students should seek an academic faculty advisor in their area of concentration to advise on their program of study, including course registration and preparation for the qualifying examination. Students should also speak to area faculty to choose a research advisor and the research topic they will begin after passing the qualifying examination. The academic advisor and the research advisor could be the same person. Students can always visit theAssociate Chair for Graduate Studies to discuss any issues regarding their program.

1. Admission Requirements

Applicants are expected to have a master's degree in computer engineering, computer science, electrical engineering, or other related fields.

Superior undergraduate students may apply to be admitted directly into the Ph.D. program. Such an accelerated program requires a minimum entrance GPA of 3.5, plus an interview with the ECE department Graduate Affairs Committee.

Students must demonstrate superior academic background in engineering, mathematics, and physical science; skills in programming; and proficiency in major areas of computer engineering and science. A minimum master's GPA of 3.5 on a 4.0 scale, or equivalent, is required for admission. GRE scores must be submitted. Foreign students must also achieve a minimum TOEFL score of 550.

Students who lack an appropriate background will be required to take additional bridge courses that cannot be applied as degree credits.

2. Degree Requirements

A program of study is determined in consultation with a department advisor. The student is required to pass a qualifying examination. Ph.D. students with a recognized Master's degree or equivalent are required to take four 700-level 3-credit courses (12 credits). Ph.D. students with a recognized Baccalaureate degree are required to take eight 600-level or 700-level 3-credit courses (24 credits) of coursework beyond the Baccalaureate degree as well as four additional 700-level 3-credit courses (12 credits), for a total of twelve 3-credit courses (36 credits). Master's project (course 700), Master's thesis (course 701), or more than two independent study courses (courses 725 and 726) cannot be used to satisfy these coursework requirements. A Ph.D. student may substitute a 600-level course for a 700-level course only after the academic advisor appeals on behalf of the student to the Office of Graduate Studies and receives approval. A Ph.D. program may define an additional set of required courses that must be pre-approved by the academic college (multiple colleges may be involved for interdisciplinary programs). Whether or not a program requires additional courses above the aforementioned minimum requirements, a Ph.D. student's dissertation committee may ask the student to take additional courses.

Ph.D. Dissertation Registration Requirements:

- Ph.D. students who pass the Qualifying Examination (QE) must then register for 3 credits of pre-doctoral research (792B) per semester until they defend successfully the dissertation proposal.

- Ph.D. students who defend the dissertation proposal successfully must then register for the 1-credit dissertation course (790A) each semester until they complete all degree requirements.
- Students may take courses simultaneously with the 790 or 792 course as per Ph.D. program guidelines or dissertation committee recommendation.
- Students who do not meet the following deadlines will be dismissed from the Ph.D. program.
- The required coursework for the Ph.D. program and the (major part of the) QE must be completed successfully by the end of the second year in the program.
- The dissertation proposal must be defended successfully either by the end of the third year in the Ph.D. program or four semesters after registering for the first time in the 792 pre-doctoral research course, whichever occurs earlier.
- The dissertation must be defended successfully by the end of the sixth year in the Ph.D. program.

- All doctoral students must register for six semesters of ECE 791 Graduate Seminar. In order to receive passing credit, the student must attend at least five (5) seminars per semester, to be chosen from those sponsored by the areas, the ECE department, the Institute, or other outside seminars approved by the Seminar Supervisor. Please watch the bulletin board labeled *ECE 791 Graduate Seminar*, located in the hall leading to the ECE main office, for information on approved seminars.

- Students who wish to change majors may do so only once. If students receiving ECE department financial support wish to change majors, their applications for financial aid will be re-evaluated, at the time of switching, as if they were new applicants.

B.S. to Ph.D. Program

Superior undergraduate students may apply to be admitted directly into the Ph.D. program. Such an accelerated program requires a minimum entrance GPA of 3.5, plus an interview with the ECE department Graduate Studies Committee.

- All doctoral students must register for six semesters of ECE 791 Graduate Seminar. In order to receive passing credit, the student must attend at least five (5) seminars per semester, to be chosen from those sponsored by the areas, the ECE department, the Institute, or other outside seminars approved by the Seminar Supervisor. Please watch the bulletin board labeled *ECE 791 Graduate Seminar*, located in the hall leading to the ECE main office, for information on approved seminars.

- Students who wish to change majors may do so only once. If students receiving ECE department financial support wish to change majors, their applications for financial aid will be re-evaluated, at the time of switching, as if they were new applicants.

3. Qualifying Examination

Goal: ECE Department's qualifying exam needs to be a constructive component in the development of a student's research skills and use the course work requirements to identify potential doctoral students.

Exam Structure: The Ph. D. Qualifying Exam has two parts: I) GPA requirement on selected courses, and II) Research potential assessment.

Part I. GPA Course Requirements:

ECE Course Requirement: Prequalified doctoral students are required to pass four courses selected from a list of relevant doctoral courses ("core courses") with a GPA of at least 3.5 or higher.

Each research group (Communications, Signal Processing and Microwave; Computer Networking; Computer Architecture, Electronic and Photonic Devices; and Intelligent Systems) has its own list of courses. Courses are listed at the bottom of this section.

Part II. Research Potential Assessment Oral Qualifier:
The research potential assessment oral qualifying examination must be taken within the first year from the time the student starts the Ph.D. program if he/she has a MS degree. In the case of a student accepted into the BS-Ph.D. track, the exam must be taken within two years from the time the student starts the Ph.D. program. For the students accepted with a MS degree, within the first two semesters from the time the student starts the Ph.D. program the student must complete one Independent Research course in his/her research area of interest. For the Independent Research course, the student registers with a faculty member who may or may not be the student's prospective Ph.D. advisor.

The oral exam committee will be assigned by the Associate Chair for Graduate Studies of the ECE Department. It will be chaired by a faculty member from an area different from the student's area of interest. In addition to the Chair, the committee will include three faculty members in the student's area of interest. The supervisor of the independent research work or the student's prospective advisor may be part of the committee.

A student must send in an official application for taking the oral Qualifying exam to the Associate Chair for Graduate Studies, at least one month before the target date of the oral exam committee. The student is responsible to find a time such that all committee members can attend. In the application, the student should identify the research focus area for the exam and outline how the course requirements (if any) for that focus area have been met.

For the oral exam, the student will prepare a written report to the committee and to the associate chair for graduate studies at least one week before the exam date. The report should be written following the standard format of a conference paper, with 4-6 pages in double column, font size 11. The subject of the oral exam is to be chosen by the student. It is recommended that this choice be made in consultation with a faculty advisor and the ECE associate chair for graduate studies. A suitable basis for the examination may include, but is not restricted to:

- A paper/report (conference, journal, technical report, patent, and/or published or submitted)
- A conference paper submission based on research under the supervision of a faculty advisor.
- An M.S. thesis in preparation or previously completed thesis
- A final project report derived from an ECE Independent Study course.

During the exam the student will make a 30-minute oral presentation of his/her own independent research to the oral exam committee.

The oral presentation will be followed by an open-ended question and answer session that may include questions specific to the research project as well as questions generally relevant to the research area regarding fundamental knowledge underpinning the project topic. In addition, basic questions from various different areas can be asked to determine student's breadth of understanding.

Since this examination will occur in the early stages of research, and since the oral exam is not a doctoral defense, the presented paper need not lead to a Ph.D. thesis proposal. For the examination committee, evaluation of the originality and novelty of the research contribution will be secondary to an evaluation of the student's critical thinking skills. Specifically, the committee will focus on the student's ability to analyze, interpret and articulate both strengths and weaknesses of the work. Outstanding students, who have published several papers prior to starting their Ph.D. program, are encouraged to take the oral qualifying exam during the first semester of the Ph.D. program.

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chairperson typically is the doctoral candidate's program advisor, but other faculty may be selected, provided that they are from the ECE department. The committee consists of a minimum of five members, one of whom is external to the ECE department or to NJIT, and at least three of whom are members of the ECE department. The dissertation advisor must be a tenure-track or tenured faculty member at NJIT. If the dissertation advisor is an ECE department faculty member, then the chair of the student's dissertation committee may be any tenure-track or tenured faculty member in the ECE department at NJIT. If the dissertation advisor is not a member of the ECE department at NJIT, then the chair of the student's dissertation committee must be a tenured faculty member in the ECE department at NJIT. If the dissertation advisor is not an ECE department faculty member, there must be a co-advisor who is a tenure-track or tenured faculty member in the ECE department at NJIT.

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Students who wish to apply for financial aid must be recommended by a faculty member who will submit a letter to the chair of the ECE Graduate Affairs committee on behalf of the doctoral student. Preference is given to students who have passed the qualifying examination.

XI. FACULTY RESEARCH AREAS/INTERESTS

Ali Abdi
(Communications, Signal Processing and Microwaves)

Digital communication and propagation modeling in wireless channels (underwater and RF), channel and parameter estimation techniques, blind modulation recognition, systems biology, molecular networks and cell signaling.

Ali N. Akansu
(Communications, Processing and Microwaves and Computer Networking)

Signal and transform theories, financial engineering and electronic trading, big data finance, high performance DSP (FPGA, GPU), and computing.Signal

Nirwan Ansari
(Communications, Signal Processing and Microwaves and Computer Networking)

Green communications and networking, cloud computing, big data driven networks, broadband networks, network security, multimedia communications, computational intelligence

John Carpinelli
(Computer Architecture and Systems)

Interconnection networks for multiprocessor systems and switching systems, improved routing algorithms, fault-tolerant hardware and software, optimizing fault-tolerant network performance under no-fault conditions, engineering education research including the development of educational software.

Atam Dhawan
(Intelligent Systems)

Intelligent medical image analysis, medical imaging, multi-band wavelets, 3-D image reconstruction, neural networks, adaptive learning, genetic algorithms, pattern recognition.

Bernard Friedland
(Intelligent Systems)

Control theory, especially methods for control of linear and nonlinear systems with data sources of multiple types; applications to friction modeling, compensation, traction control; rapid thermal processing; robotic vehicle navigation and control.

Hongya Ge
(Communications, Signal Processing and Microwaves)

Statistical and array signal processing, reduced-rank subspace methods, detection, estimation, and spectral analysis, adaptive transceiver design for communications, numerical analysis and approximation theory.

Haim Grebel
(Electronic and Photonic Devices)

Nano-technology (e.g. grapheme, carbon nanotubes, surface Plasmon lasers, nano-bio), Artificial Dielectrics (AD) for optical and microwave purposes including ultra short pulse antennas (USP antennas, and Infrared (IR) resonating structures for filter and spectral bench-top applications.

Alex Haimovich
(Communications, Signal Processing and Microwaves)

MIMO and array processing for radar and communications, geolocation, wireless networking, modulation recognition.

Edwin Hou
(Computer Architecture And Systems and Computer Networking)

High speed networks, embedded systems, scheduling, genetic algorithms, neural networks, nonlinear optimization techniques, robotics, infrared imaging.

Walid Hubbi (Intelligent Systems) — Engineering education and power system analysis, power system security, economic operation, distributed generation of electric power, power system operation in a deregulated environment, incorporating technologies that can enhance the learning experience in the University.

Moshe Kam (Intelligent Systems) — Detection and estimation, sensor networks, team decision making, multisensor architectures, data and decision fusion, hard/soft data fusion, navigation and Robotics, target tracking, modeling and simulation, engineering education.

Abdallah Khreishah (Computer Architecture and Systems and Computer Networking) — Internet of things, wireless networks, visible light communication, network security, content centric networking, tactical communications networks, vehicular networks.

Joerg Kliewer (Communications, Signal Processing and Microwaves) — Modern error correcting codes, network coding and network error correction, network information theory, communication networks.

Dong-Kyun Ko (Intelligent Systems) — Synthesis, characterization and application of semiconductor nanocrystals, nanoelectronics, quantum dot solar cells, nanocomposite thermoelectrics.

Qing Gary Liu (Computer Architecture and Systems and Computer Networking) — Big data (related system software, large-scale data management, data analytics, etc.), high-performance computing, parallel computing, I/O and Storage, high-speed networking.

Xuan Liu (Electronic and Photonic Devices) — Optical coherence tomography, fiber optics for imaging and sensing, optical signal processing, physics in biophotonics

Durgamadhab Misra (Electronic and, Photonic Devices and Computer Architecture and Systems) — Nanoelectronics, High-K gate dielectrics, reliability of CMOS gate oxide, hot carrier effects, interface state reduction through deuterium implantation, Si and SiGe photodetectors, VLSI Design: ASICs, VHDL, Network Architectures, Integrated sensors: chemical sensors and sensor networks, interface circuits, magnetic field sensors.

Hieu Nguyen (Electronic and Photonic Devices) — Epitaxial growth and characterization of lll-nitride nanostructures, semiconductor nanostructures for nanoelectrnoics and optoelectronics, lll-V based materials and devices, light emitting diodes, laser diodes, photodetectors, solar fuels, solar cells.

Edip Niver (Communications, Signal Processing and Microwaves) — Wave propagation, antenna and microwave engineering, fiber optic communication systems, applications to biomedical and transportation systems, and numerical methods.

Bipin Rajendran (Computer Architecture and Systems) — Biomimetic engineering & computation, architectures and systems for intelligent computing, internet of things, algorithms & analytics for urban challenges.

Roberto Rojas-Cessa (Computer Networking and Computer Architecture and Systems)	High speed networks, switching and routing, network security, network measurement, data center and cloud computing, network protocols, smart grid communications .
Jacob Savir (Computer Architecture and Systems)	Test generation, fault simulation, design for testability, computer-aided design, built-in self-test.
Yun-Qing Shi (Intelligent Systems)	Image/video processing and their applications to industrial automation and biomedical engineering, data hiding, image authentication, digital forensics, signal modulation recognition, medical video compression.
Osvaldo Simeone (Communications and Signal Processing and Microwaves)	Wireless communications, information theory, data compression, machine learning.
Marek Sosnowski (Electronic and Photonic Devices)	Materials and structures for micro-electronic and optoelectronic applications, thin film deposition, ion beam modification of materials.
Leonid Tsybeskov (Electronic and Photonic Devices)	Group IV semiconductor nanostructures and devices; scanning tunneling microscopy (STM and STM-based spectroscopy, optical characterization including Raman scattering, photoluminescence and modulation spectroscopy, SiGe nanostructures for light emitters and optical interconnects.
Cong Wang (Intelligent Systems)	Robotics, servo systems, large scale machine learning, dynamic systems and controls, automation and industrial networks, multi-objective robust Optimization.
Gerald Whitman (Communications, Signal Processing and Microwaves)	Radiation, propagation and scattering of electromagnetic waves; antennas theory, rough surfaces scattering, transport theory applied to scattering in vegetation.
MengChu Zhou (Intelligent Systems and Computer Networking)	Intelligent automation and robotics, petri nets, sensor networks and internet of things, web services, discrete-event and hybrid systems, renewable energy and smart grids, big data and machine learning, high-speed trains and systems.
Sotirios Ziavras (Computer Architecture and Systems)	Chip multiprocesors, advanced computer architecture, sysem-on-a-chip design, parallel processing and supercomputing, embedded systems, reconfigurable Computing, VLSI design and FPGA-based system prototyping.

New Jersey Institute of Technology
Department of Electrical and Computer Engineering
Ph.D. Progress Report

Name of Student:			**Student ID No.:**		
			Full/Part Time:		
Admission Date:			**Focus Area:**		
Courses Taken	**Dates**	**Courses Taken**	**Dates**	**Courses Taken**	**Dates**
Qualifying Exam	Major:			Date Passed:	
	Minor:			Date Passed:	
Dissertation Advisor(s):					
Dissertation Committee	Date of Committee Formation:				
Committee Chair:					
Committee Member/Rank/Affiliation:					
Proposal Defense	Date:		Results:		
Final Defense	Date:		Results:		
Semester/ support[†]					
List of Papers Published, Accepted, Submitted (attach a separate sheet if needed):					
Student's Signature/Date		**Dissertation Advisor Approval/Date**		**ECE Graduate Advisor Approval/Date**	
Initial:		Initial:		Initial:	
2nd update:		2nd update:		2nd update:	
3rd update:		3rd update:		3rd update:	
4th update:		4th update:		4th update:	
Remarks:					

[†]Types of support: TA (teaching assistantship), RA (research assistantship), F (fellowship), NA (not available)

study plans

MS Electrical Engineering
https://web.njit.edu/~dmisra/MSEE/Study.htm

MS Computer Engineering
https://web.njit.edu/~dmisra/grad_studies/MSCoE.htm

MS Telecommunications
https://web.njit.edu/~ansari/StudyPlantelecom.pdf

MS Internet Engineering
https://web.njit.edu/~ansari/StudyPlanIE.pdf

MS Power and Energy Systems
https://web.njit.edu/~ansari/MSPES.htm

ALL OTHER FORMS

http://www5.njit.edu/graduatestudies/forms.php