PNW School of Engineering Graduate Handbook

August 2020

OVERVIEW

This handbook is designed to provide helpful advice to students planning or pursuing graduate studies in School of Engineering at Purdue University Northwest. However, students are advised that the final authority for graduate study is at Purdue University Graduate School. Please read current edition of Policies & Procedures for Administering Graduate Study Programs published by Purdue University Graduate School.

Purdue University Northwest (PNW) provides opportunities for qualified individuals who wish to work towards a Master's degree. Full or part-time study can be arranged to help suit each graduate student's schedule. All applications are to be submitted electronically.

The PNW School of Engineering includes the Department of Computer Science, Department of Electrical and Computer Engineering and the Department of Mechanical and Civil Engineering. The graduate programs are as follows:

- Master of Science in Computer Science (MSCS)
- Master of Science in Electrical and Computer Engineering (MSECE)
- Master of Science in Mechanical Engineering (MSME)
- 4+1 Combined Degree Programs
    - Bachelor of Science in Civil Engineering (BSCE) + MSE
    - Bachelor of Science in Computer Engineering (BSCmpE) + MSECE
    - Bachelor of Science in Electrical Engineering (BSEE) + MSECE
    - Bachelor of Science in Mechanical Engineering (BSME) + MSME
- Master of Science in Engineering (MSE)
    - MSE Interdisciplinary
    - MSE with Concentration in Civil Engineering
- Engineering Project Management Graduate Certificate

These programs provide a rich academic environment. The school seeks to select students whose applications document their outstanding ability, preparation, and potential for successful completion of graduate study. All applications are to be submitted electronically.

After a student is admitted into a graduate program, a faculty advisor will be assigned. It is the student's responsibility, with guidance from his/her adviser, to follow the procedures and meet the specified deadlines.

The faculty has the ultimate responsibility for the comprehensive graduate program. The Chairman of each department, in consultation with the faculty, appoints faculty members to serve on the departmental Graduate Committee (GC). The GC approves all ordinary procedural matters, as well as makes recommendations to the faculty for discussion and approval for any extraordinary changes in degree programs or in departmental policies. The Graduate Coordinator leads the Committee and handles the day-to-day obligations of the graduate studies program,

Table of Contents

I. General Admission Procedures

A. Documents Required for Admissions

1) Electronic Application
To start your Graduate School application, create an application online. Instruction for electronic application can be found on the Purdue University Northwest Graduate Studies Office Website: How to Apply.

2) Statement of Purpose
A statement of purpose is an essay of approximately 500 words explaining your purpose for undertaking or continuing graduate study, your reasons for wanting to study at Purdue, and your professional plans, career goals, and research interests. You may also explain any irregularities or special circumstances applicable to your background, and elaborate on your special abilities, awards, achievements, scholarly publications, and/or professional history. Some programs may require a specific format.

3) Transcripts
Upload to the online application transcript(s) and/or academic document(s) **for every institution of higher education attended regardless of whether or not a degree was received**.

- If a degree was received, it must be printed on the transcripts. If no degree conferral is printed on the transcripts, a copy of the original diploma (degree certificate) is needed.
- Official transcripts and/ or English translations must be mailed directly from a Registrar's office to the Office of Graduate Office. If a transcript is not in English, you must also upload an English translation certified by the college or university which issued it.
- The uploaded transcript and/or academic document must be from the official version of the document. An official transcript bears the original signature of the registrar and/or the original seal of the issuing institution. **An unofficial transcript printed from current/previous institution(s) student system is not an acceptable document**.
- **Official transcripts and/or academic records** bearing the original signature of the registrar and/or the original seal of the issuing institutions will be required after admission.

4) Test Scores
International degree-seeking applicants whose native language is not English are required to submit Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) scores for Purdue University Graduate School admission.
The Graduate School accepts valid TOEFL scores earned through the paper-based test and Internet-based test. Institutional TOEFL scores (ITP) are not accepted. The minimum paper-based test score required for admission is 550. The minimum Internet-based test scores required for admission are the following:

- Writing 18
- Speaking 18
- Listening 14

- Reading 19
- Total 80

Note that in addition to required minimum scores for writing, speaking, listening, and reading, the Graduate School also requires a minimum overall score that is higher than the minimums for the four area tests combined. Applicants must meet or exceed each of the five scores (listed above) for admission to the Graduate School. Some graduate programs require higher minimum scores. Please check with your program of interest for additional requirements.

Only official TOEFL scores received directly from Educational Testing Service are acceptable. For further information, visit TOEFL.org. TOEFL score reports are only valid for two years. Purdue University Northwest's code for the TOEFL application is 1638.
The Graduate School accepts International English Language Testing System (**IELTS**) test scores in addition to the TOEFL. An overall band score of 6.5 is required for admission. Minimum scores are required for the following:

- Writing 5.5
- Speaking 6.0
- Listening 6.0
- Reading 6.5
- Overall score 6.5

For more information, visit IELTS.org. Only IELTS scores received directly from the testing facility are considered official.

5) Recommendations
Three letters of recommendation must be submitted either online or using the GS-3 Recommendation Form. Recommendations from faculty or those who are familiar with the applicant's academic background are desirable. When you create an online application to the Purdue Graduate School, you will have the opportunity to enter the names of your recommendation providers. Once you click "Send to Recommender" your recommendation providers will receive an email with instructions on submitting their recommendation online. The Purdue University Graduate School strongly encourages you to provide an email address affiliated with your recommenders' academic institution, professional organization, or employer. Once the online recommendation is submitted, the graduate program to which you applied will have access to view your online recommendation.

For recommenders wishing to complete a paper recommendation, please send the following recommendation form Graduate School Form 3 Recommendation for Admission (PDF).

6) Additional Required Documents for International Students:
A true and attested copy of the applicant's diploma or a Provisional Certificate and letter from a university indicating when the diploma will be issued.

B. GPA Requirement

1) **Unconditional Admission** to the M.S program requires a B (3.0/4.0) or better grade point average in prior study.

2) **Conditional Admission** may be granted to applicants under the following three circumstances:
   - When the applicant's background shows some academic deficiency.
   - When the applicant's GPA at the institution from which he/she most recently graduated is lower than 3.0/4.0. In addition, the Graduate School may place a condition on the amount of prior coursework available for use on a graduate plan of study.
   - When a required supporting document from the applicant is missing.

C. Application Deadlines

Applications and all supporting documentation must be received before the deadlines listed below:

Applicant	Fall	Spring	Summer
U.S. residents and other applicants in the U.S.	July 15	December 1	May 1
Applicants outside the U.S.	May 15	October 15	March 15

Note: Computer Science only accepts application for Fall and Spring.

D. 4+1 Combined Degree Program Application

1) PNW undergraduate engineering student can apply if meets the following requirements a:
   - Minimum 65 credits (Junior or Senior standing)
   - Minimum 3.25 GPA
   - B- or higher grade in all completed Engineering core courses

2) A Combined-Degree Request Form (Graduate School Form GS–27) needs be submitted together with regular application materials.

II. General Operating Procedures

A. Advising Procedure

New graduate students will be assigned an academic advisor based on research or study interests indicated in the applicant's statement of purpose. If a student decides to conduct his/her thesis research under a professor who is not the academic advisor assigned originally, the thesis advisor will be assigned as the student's academic advisor. Students should consult with their advisers as early as possible in order to plan their courses or thesis research.

B. Registration Procedure

Students can register their needed classes after login to the myPNW portal. The step-by-step instruction can be found on the Office of the Registrar How to Register for Classes Online. A student needs to get a permission from the instructor and department chair in order to register a course which is full. Students should consult with the academic advisor to approve the Plan of Study and Thesis Defense.

C. Plan of Study

Graduate students must submit an electronic Plan of Study to the Graduate School prior to the semester in which they plan to graduate**.** The Plan of Study outlines the student's courses and credit hours and reflects the courses required to earn the degree. The student and student's advisory committee develop the plan of study together. The Plan of Study must be approved by the student's academic advisor before submission to the Graduate School. The student is responsible for completing and submitting (as final) Plan of Study to the Graduate School. The Plan of Study Generator can be accessed on **the Grad School tab through myPNW**

The development of the plan of study should begin as early as possible, however, graduate students will not have access to the plan of study generator until after they have completed their first semester as a degree seeking student. The major professor (faculty advisor) or temporary advisor will discuss the student's background, interests, and degree objectives as part of the preparation for the first enrollment. The advisor will then suggest courses appropriate for the student's interests. The major professor will also recommend possible related areas and advisors.

Each Master's degree plan of study consists of a primary area and one or more related areas. Both the primary area and the related area(s) are based on the relationship of the course content and not on the departmental course prefix. The plan of study must list all courses the student will take to meet the degree requirements. These include the names for the primary and related areas of study; the course number, course title, and credits for each course; the date when the course was or will be completed; and the research area. The plan of study is signed by each member of the advisory committee and the student. After review by your program, the plan is then submitted to the Graduate School for formal approval.
Upon approval by the Graduate School, the plan of study becomes a contract among the student, the admitting program, and the Graduate School. When all requirements of the plan of study are completed satisfactorily, the student is awarded the Master's degree.

Students should periodically review the plan of study and the progress of its completion with

your faculty advisor. After the Plan of Study is on file, committee and course changes can be made at any time up until graduation.

It is important to remember that submitting a plan as Draft simply makes it available to view by the plan of study coordinator in a student's department. A plan of study must be submitted as FINAL by the student in order for it begin the review and approval process.

Graduation Requirement

1) Non-Thesis Students

- Student: Submit Plan of Study **during their second to last semester in their program**. Changes can be made prior to graduation.
- Student: Email your department and graduate office and advise them of your intent to graduate before the Last Day to Declare Candidacy (check the Graduate Studies calendar for deadline).
- Faculty/department: Complete GS-Form 7, Report of Master's Examining Committee through Graduate School Database.
- Student: Complete 30 credit course work with 3.0 GPA.

2) Thesis Students

- Student: Meet with your academic advisor to make sure you are on track.
- Student: Submit your electronic Plan of Study **during their second to last semester in their program**. Changes to your plan can be made prior to the last week of regularly scheduled classes.
- Student: Email your program and advise them of your intent to graduate before the Last Day to Declare Candidacy (check the Graduate Studies calendar for deadline).
- Student: The final exam must be held according the deadlines established by the Graduate School for that particular semester. To schedule a final examination (thesis defense), the **Graduate School Form 8 (GS Form 8): Request for Appointment of the Examining Committee** must be electronically submitted at least three weeks prior to the Final Exam Date. Please note that the plan of study for this degree must be in 'Outstanding' or 'Approved' status to initiate an exam request. The GS Form 8 must reach the Graduate School at least two weeks before the date of your defense. This form is located through myPurdue in the Graduate School's Plan of Study Generator. Please see instructions for completion. Form 8 Instructions
- Student: A copy of the thesis should be submitted to the Examining Committee members at least two weeks before the examination date
- Student: Submit your electronic Graduate School Form 9 (GS Form 9): Thesis Acceptance Form 9and GS Form 32, Thesis Agreement before the day of your defense.
- Student: Meet with PNW Thesis Format Advisor and review hard copy to make sure format guidelines are understood. Send electronic file of thesis to the Format Advisor for final format approval.
- Student: Submit final thesis based on instructions form the Format Advisor
- Faculty Thesis Advisor: Review using the iThenticate software and any issues identified by the software addressed prior to deposit of the final thesis with the Graduate School. Satisfaction of this requirement will be certified by the committee chair and degree candidate on the Electronic Thesis Acceptance Form
- Faculty/department: Complete GS Form 7: Report of Master's Examining Committee

and GS Form 9 through Graduate School Database.

- Student: Must be enrolled in thesis research during the semester prior to the Final Examination. Complete 21 credit course work with 3.0 GPA and thesis requirement.

D. General Academic Requirements

The student's progress is reviewed each session by the academic professor. Should the student fail to perform in either coursework or research on a level acceptable to the advisory committee, the departmental graduate committee, or the Dean of the Graduate School, he or she may be asked to discontinue graduate study at Purdue.

1) GPA* Requirement

All graduate students are expected to maintain a graduation index representing a B average (3.0/4.0 GPA.) or better.

Semester GPA	Accumulative GPA	Status
≥ 3.0/4.0	≥ 3.0/4.0	Good Standing
2~2.99		Less than Good Standing
	2~2.99	Less than Good Standing
< 2		Probation
	< 2	Probation
On probation		
< 2	< 2	Drop
< 2	≥ 2	Probation
≥ 2	< 2	Probation
≥ 2	≥ 2	Off Probation (may be less than good standing)

*GPA Calculation:

a) Neither excess undergraduate Purdue courses nor courses transferred from another institution are used in computing the graduation index.

b) Courses taken as pass/not pass or satisfactory/unsatisfactory are unacceptable on plans of study. Grade option changes will not be approved by the Graduate School except in cases of a clerical or mechanical error during the normal drop/add period.

2) Grades for Research Registration

A graduate student is also expected to earn S grades for research registration. Two consecutive sessions of U grades for research registration mandate that the department takes formal action and informs the student, in writing, and the Graduate School with regard to discontinuation or conditions for continuation of the student's graduate study.

3) Dropped from the University

Any graduate student appropriately dropped from the university must reapply. A graduate student who has been dropped for the first time is not eligible to register for at least one fall or spring semester (and summer session if applicable) following drop status. Graduate students dropped a second time at the end of the spring 2020 semester or later will normally not be considered for readmission to the Purdue University Graduate School for at least one year.

E. Graduate (Teaching or Research) Assistant Appointments

Graduate Teaching Assistant positions are available fall and spring semesters. Graduate Research Assistant positions may be available through individual faculty members or the department.

To be eligible to hold a graduate staff appointment during any session, an individual must enroll as a graduate student in a degree program and be registered for a minimum of three credit hours of graduate level course and/or research work during the entire appointment period. (Graduate staff on appointment during the summer is obligated to register for a minimum of three graduate hours during at least one of the summer modules.)

The employment of international students is governed by federal regulations. Prior to employing international students, detailed regulations should be obtained from the International Programs Office IPO). It is University policy that all graduate teaching assistants whose native language is not English must demonstrate adequate oral English proficiency before being assigned duties involving direct instruction of students.

F. Graduate Staff Fee Remission Policy

1) Employment Requirements

Graduate student staffs appointed as Graduate Assistants receive a tuition and fee remission during the semester and summer session that they are employed. The fee remission relieves the graduate student of the obligation to pay full tuition and fees and requires the student to pay only a nominal fee each semester and one-half the semester rate during the summer.

2) Eligibility

A student is eligible for the graduate staff fee remission if the appointment is in effect during the first six weeks of a semester or through July 1 of the summer session. If a graduate staff appointment terminates within the first six weeks after the start of a semester or prior to July 1 during the summer session and coursework is continued, all fees will be assessed for the semester or summer session.

Students enrolled in the summer session are eligible for summer fee remission if they held a teaching assistantship in the prior spring semester and also will be appointed to a teaching assistantship in the following fall semester.

A student who held a teaching assistantship in the spring semester but will not hold one in the fall semester because he or she will complete degree requirements during the summer may be granted a tuition and fee waiver for the summer session.

G. Non-Degree Status to Degree

A student in non-degree status who wishes to be considered for admission to a degree program must submit a new application, accompanied by the same materials required of other degree-seeking applicants.

H. Additional Rules and Requirements

1) Full-Time Study

Students may take any number of credit hours each semester. However, to be considered

full- time, students must carry at least eight credit hours (or six hours and a graduate assistantship) during Fall or Spring semester. During summer session, full time graduate student must carry at least six credit hours (or three hours and a graduate assistantship). International students are required to be full-time student in the spring and fall semesters except during the final academic session.

2) Part-Time and Intermittent Study

Part-time students must, like full-time students, be registered any time they use university facilities or receive faculty supervision. Students who have interrupted their graduate study must submit a new application if three or more consecutive academic sessions (including summer session) have elapsed since their last registration.

3) Registration in the Final Academic Session

- All students must be registered in the session of graduation.
- Students with outstanding incomplete grades for courses listed on the Plan of Study will not be permitted to graduate.
- Privileged Registration
  - Examination Only Registration (For students admitted prior to Fall 2020)
    A student who has completed the Graduate School's residency requirement (30 hours for a master's degree) and who has finished all degree requirements except for the final examination and depositing the thesis prior to the first day of the academic session of graduation may request registration of "Examination Only" at a reduced fee.
  - Degree Only Registration
    A student who has completed the Graduate School's residency requirement (30 hours for a master's degree) and who has finished all degree requirements except depositing the thesis and for whom a positive Report of the Final Examination has been received in the Graduate School prior to the first day of the academic session of graduation but who has not been awarded the degree may request registration for "Degree Only" at a reduced fee.
  - Approval
    Privileged registration requires Graduate School approval. The completed Course Request should be sent to the Graduate School for approval and processing.

4) Notes for International Graduate Students & Scholars

Graduate F-1 visa students must be enrolled in and complete a minimum of 8 credit hours (6 credit hours if they have a Graduate Assistant Position) each Fall and Spring semester. International students should never drop a course without discussing it with their academic advisor or mentor, as well as the International Programs Office (CLO 176).

Dropping below the minimum required credits would immediately put an international student out of good immigration status (which would require filing for a reinstatement or departing the United States within a few days of falling out of status). This authorization must come from the International Programs Office and must be recorded on the immigration documents. There are a few reasons when a Reduced Course Load can be approved, in advance only. RCL is authorized only one semester per program (unless for medical reasons)

- First semester studying in the USA and experiencing difficulty adjusting to the American educational system

- Verified medical/psychological illness
- Natural disaster
- Final semester of study

International students on probation follow the same regulations that domestic students follow. They must achieve a certain Grade Point Average (GPA) in order to remove probation. The GPA depends on their classification, and this is information may be obtained from their advisors. If academically dropped, they must transfer immediately to another institution or depart the United States.

International students can take only one distance learning course per semester that counts toward the minimum number of required credit hours per semester. International students cannot work off-campus unless authorized by the International Programs office. This includes all paid internships, coops, or other work experience that is an integral part of the student's program. Students must be on campus for one academic year prior to participating in an off campus work experience (also known as Curricular Practical Training in immigration terminology).

5) Readmission

An applicant who, after being granted admission by the Graduate School, does not enroll for three or more consecutive academic sessions (including the summer session) must submit a new application and pay the application fee. Updated or additional admission information may be required. Conditions may be placed on admission.

Upon the recommendation of the department and on a case by case basis, special consideration will be given to students returning to continue their graduate studies after being called to active military service.

Five-Year Rule: Course credits earned by a student whose graduate study and/or professional activity have been inactive for five years or more cannot be used on a plan of study for an advanced degree. A plan of study approved prior to such a period of inactivity is invalid. A preliminary examination passed prior to such a period of inactivity is invalid.

Readmission is granted by the dean of the Graduate School. The dean of the Graduate School will notify students who have been readmitted, and a copy of the readmission letter will be sent to the department

6) Credit for Pre-Admission Course Work

A maximum of 12 semester credits of courses with grades of B or better and satisfying course requirements on the approved plan of study may be used, subject to approval of the student's advisory committee. This limit applies to all pre-admission course work, including post-baccalaureate credit at Purdue, undergraduate excess credit, and transfer credit.

III. Mechanical and Civil Engineering (MCE)

A. Basic Degree Programs in Mechanical Engineering

1. Mechanical Engineering, MSME

The MSME degree program requires a total of 30 credit hours to be completed, with thesis or non-thesis option. It is anticipated that the degree may be completed in two years of full time graduate study. To earn the Master of Science in Mechanical Engineering (MSME) degree, students must complete 30 credit hours, with a minimum cumulative graduate grade point average of 3.0 for the courses listed in the Plan of Study.

1) Assistantships

Teaching and research assistantships are available to qualified graduate students.

2) Course Requirements

One advanced mathematics course (3 credit hours) at the 50000-level taught by either the mathematics department or one of the engineering departments is required for both thesis and non-thesis options.

3) Thesis Option

Thesis option allows a student to earn credit for conducting independent research leading to a publishable report or thesis. This option requires 21 credit hours of advanced ME/mathematics coursework and a minimum of 9 credit hours of thesis research work.

The thesis research is undertaken and completed under the supervision of a graduate faculty member and the thesis committee. The student's thesis committee is responsible for approving the research plan, monitoring progress and reviewing the thesis prior to acceptance.

Thesis option is normally available to students only after their completion of 9 credit hours with an overall grade point average of 3.0 or better in the degree program.

- 3 credit hours of advanced mathematics at the 500 level taught by either the mathematics department or one of the engineering departments.
- 18 credit hours (six (6) graduate courses) from the approved list of mechanical engineering primary courses (thermo-fluids, dynamics, structural mechanics and machine design).
- 9 credit hours of research.

4) Non-Thesis Option

The course requirements are divided into three categories:

- 3 credit hours of advanced mathematics at the 50000-level taught by either the mathematics department or one of the engineering departments,
- 24 credit hours (8 graduate courses) from the approved list of ME primary (thermofluids, dynamics, structural mechanics, machine design) courses, and
- 3 credit hours (one course) from a list of approved courses in engineering, mathematics, statistics, computer science, physics, and life sciences. Any exceptions to the above requirements must be approved by the graduate committee.

5) List of Some Primary ME Courses

ME 59700 Advanced Mechanical Engineering Projects I	(0~6)
or CE 57000 Advanced Structural Mechanics	(3)
ME 56300 Mechanical Vibrations	(3)
ME 59700 Advanced Mechanical Engineering Projects I (Musculoskeletal Biomechanics)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Theory of Plates and Shells)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Finite Element Analysis)	(0~6)
ME 50200 Numerical Heat And Mass Transfer	(3)
ME 59700 Advanced Mechanical Engineering Projects I (Computational Fluid Dynamics (CFD))	(0~6)
ME 51900 Introduction To Wind Energy	(3)
ME 52100 Air Quality Modeling	(3)
ME 52400 Design And Analysis-Heating Ventilation And Air Conditioning	(3)
ME 52300 Electronics System Cooling	(3)
ME 58300 Design of Heat Exchangers	(3)
ME 51100 Combustion	(3)
ME 59700 Advanced Mechanical Engineering Projects I (Two Phase Flow and Heat Transfer)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Matrix Analysis of Structures)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Modeling of Micro/Nano Systems)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Vehicle Dynamics)	(0~6)
ME 50000 Advanced Thermodynamics	(3)
ME 50500 Intermediate Heat Transfer	(3)
ME 50900 Fluid Properties	(3)
ME 51300 Engineering Acoustics	(3)
ME 56000 Kinematics	(3)
ME 57500 Theory And Design Of Control Systems	(3)
ME 58700 Engineering Optics	(3)

6) List of Some Related Courses

ME 51600 Advanced Engineering Project Management	(3)
ME 51500 Quality Control	(3)
ME 53400 System Engineering	(3)
ME 53600 Numerical Methods In Engineering	(3)
ME 54300 Advanced Engineering Economics	(3)
ME 59700 Advanced Mechanical Engineering Projects I (Materials Selection for Design)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Optimization and Simulation Models)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Energy System)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Solid Waste Management)	(0~6)
ME 59700 Advanced Mechanical Engineering Projects I (Adv. Mechanical Engineering Projects I)	(0~6)

2. Master of Science in Engineering (MSE) with Civil Engineering Concentration

Civil Engineering students can use the MSE Degree Interdisciplinary Engineering option.

1) Assistantships
Teaching and research assistantships are available to qualified graduate students.

2) Course Requirements
One advanced mathematics course (3 credit hours) at the 50000-level taught by either the mathematics department or one of the engineering departments is required for both thesis and non-thesis options.

3) Thesis Option
Thesis option allows a student to earn credit for conducting independent research leading to a publishable report or thesis. This option requires 21 credit hours of advanced CE/ME and a minimum of 9 credit hours of thesis research work.

The thesis research is undertaken and completed under the supervision of a graduate faculty member and the thesis committee. The student's thesis committee is responsible for approving the research plan, monitoring progress and reviewing the thesis prior to acceptance.

Thesis option is normally available to students only after their completion of 9 credit hours with an overall grade point average of 3.0 or better in the degree program.

- 6 credit hours of technical electives at the 500 level taught by the engineering departments with approval by an advisor.
- 15 credit hours (five (5) graduate courses) from the approved list of civil engineering core courses.
- 9 credit hours of research.

4) Non-Thesis Option
The course requirements are divided into three categories:

- 6 credit hours of technical electives at the 500 level taught by the engineering departments with approval by an advisor.
- 18 credit hours (eight (8) graduate courses) from the approved list of civil engineering core courses.

5) Thesis Option (30 Credit Hours)

Core Courses (15 Credit Hours)	
CE 50930 Solid Waste Management	(3)
CE 52940 Advanced Mechanics of Materials	(3)
CE 53210 Fundamentals of Design of Steel Girder Bridges	(3)
CE 53410 GIS & Remote Sensing applications in Water Resources Engineering	(3)
CE 53420 Traffic Management	(3)
CE 53430 Advanced CE Project I	(3)
CE 53610 or ME 53600 Numerical Methods in Engineering	(3)
CE 53710 Introduction to Optimization and Simulation Models	(3)

CE 53910 Advanced Hydraulics	(3)
CE 54810 Plates and Shells	(3)
CE 57000 Advanced Structural Mechanics	(3)
CE 59701 Sel Topics offered as Advanced Geotechnical Engineering	(3)
CE 59701 Sel Topics in CE offered as Groundwater Hydraulics	(3)
ME 51900 Intro to Wind Energy	(3)
ME 53400 Systems Engineering	(3)
Technical Electives (6 Credit Hours)	
CE 53430 Advanced CE Project I	(3)
CE 53610 or ME 53600 Numerical Methods in Engineering	(3)
ME 51900 Intro to Wind Energy	(3)
ME 53400 Systems Engineering	(3)
Thesis (9 Credit Hours)	
Thesis (Phase I)	(3)
Thesis (Phase II)	(3)
Thesis (Phase III)	(3)

6) Non- Thesis Option (30 Credit Hours)

Core Courses (24 Credit Hours)	
CE 50910 Watershed Management	(3)
CE 50930 Solid Waste Management	(3)
CE 52940 Advanced Mechanics of Materials	(3)
CE 53210 Fundamentals of Design of Steel Girder Bridges	(3)
CE 53410 GIS & Remote Sensing applications in Water Resources Engineering	(3)
CE 53420 Traffic Management	(3)
CE 53430 Advanced CE Project I	(3)
CE 53710 Introduction to Optimization and Simulation Models	(3)
CE 53910 Advanced Hydraulics	(3)
CE 54810 Plates and Shells	(3)
CE 57000 Advanced Structural Mechanics	(3)
CE 59701 Sel Topics offered as Advanced Geotechnical Engineering	(3)
CE 59701 Sel Topics in CE offered as Groundwater Hydraulics	(3)
Technical Electives (6 Credit Hours)	
ME 51600 Advanced Engineering Project Management	(3)
CE 53610 or ME 53600 Numerical Methods in Engineering	(3)
ME 51900 Intro to Wind Energy	(3)
ME 53400 Systems Engineering	(3)

3. Master of Science in Engineering (MSE), Interdisciplinary

Purdue University Northwest offers graduate Interdisciplinary Engineering leading to a Master of Science in Engineering degree. Courses are available in computer, electrical, mechanical, civil, metallurgical, and industrial engineering. The program has the flexibility to allow students to elect courses in one or several engineering disciplines. Teaching and research assistantships are available to qualified graduate students.

1) Special Admission Requirements

Bachelor's degree in Engineering from an institution accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Other students having adequate mathematical preparation with bachelor's degrees in non-engineering fields may be admitted on a conditional basis – they must complete 18-27 undergraduate credits in the engineering field of their choice with a GPA of 3.0/4.0 or better before being considered for full admission to the Master of Science in Engineering program.

Undergraduate GPA of 3.0/4.0 or better. Conditional admission may be granted to students with lower GPA's, with the stipulation that they must receive a grade of B or better for the first 9 credits of graduate work. Some students may be advised to complete prerequisite or additional courses which will not count toward their degree.

Post-baccalaureate admission. Students may enroll to meet individual needs for continuing education rather than for pursuing a degree. Enrollment as a post-baccalaureate student does not imply later approval for degree-seeking status, nor does it guarantee acceptance toward a degree of credit taken as a post-baccalaureate student.

2) Total 30 Credits Required

Non-thesis Option:

- At least 18 credits of ME primary graduate-level engineering courses
- At most 12 credits of graduate-level courses in engineering, math, computer science, physics, chemistry, and biology with advisor approval
- Maximum of one independent study allowed as a related course in Plan of Study (effective Spring 2013)

Thesis Option:

- 21 credits plus 9 thesis credit hours
- Six of thesis hours are considered as part of primary courses
- Maximum of one independent study allowed as a related course in Plan of Study

B. 4+1 Combined Degree Programs

1. 4+1 Combined BSCE+MSE Degree

The 4+1 programs allow students to receive both bachelor and master degree of civil engineering in five years.

1) Program Overview

The Mechanical and Civil Engineering (MCE) Department at Purdue University Northwest (PNW) offers a 4+1 combined Bachelor of Science in Civil Engineering (BSCE) and Master of Science in Engineering (MSE) with a concentration in Civil Engineering degree program. The program allows students to receive both a BSCE and MSE degree in five years, as compared to six years needed to complete these degrees separately. It provides outstanding undergraduate students enrolled in the BSCE program with opportunities to continue their graduate studies toward a MSE degree. This enables them to broaden their studies and improve their career prospects with competitive advantage by completing both the BSCE and MSE degrees at an accelerated pace.

2) Degree Description

The BSCE+MSE combined curriculum consists of all required courses for the B.S. in Civil Engineering, in addition to all of the graduate course requirements for the traditional master's program. The traditional BSCE degree requires 122 credits and the MSE degree requires 30 credits, for a total of 152 credits. The combined program allows students to use 9 credits of graduate level courses approved by the Graduate Advisor or the Graduate Committee of the MCE Department to satisfy both the B.S. and M.S. graduation requirements, thereby reducing the number of required credits for the combined BSCE+MSE degree to 143 and making it possible for qualified students to complete both degrees in five years.

Students in this program will receive their BSCE degree upon completion of the undergraduate curriculum and their MSME degree later upon completion of the graduate curriculum requirements.

3) Thesis and Non-Thesis Options

The graduate portion of the combined program offers both thesis and non-thesis options. However, additional semesters may be required to complete a thesis research project.

4) Admission Requirements

The requirements for admission to the combined program are more stringent than the admission standards for the traditional Master of Science program. The admission process consists of the following two steps:

a) Initial Conditional Admission

Students should **start the application in their junior year after completion of 65 credits toward the BSCE**. Requirements for initial conditional admission:

- Current undergraduate student at PNW with a minimum of 65 credits toward BSCE degree
- Minimum 3.25 GPA
- B- or higher grade in all completed Civil Engineering core courses

b) Final Admission to the Graduate Program

After receiving conditional admission to the program, the student is required to submit a Plan of Study for the MSE degree. **Nine credits of graduate level courses**, which are used to satisfy both BSME and MSME degree requirements, must be identified on both the undergraduate and graduate Plan of Study and approved by the Graduate Advisor or the Graduate Committee of the MCE Department **prior to the last semester of the undergraduate study**. Final admission to the graduate program is determined after completion of all course requirements for the BSCE degree. Requirements for final admission to the graduate program:

- Minimum 3.25 overall GPA
- B- or higher grade in all Civil Engineering core courses
- B- or higher grade in each of the graduate courses (9 credits) approved for both B.S. and M.S. Plan of Study

4+1 Application Process

2. 4+1 Combined BSME+MSME Degree

The 4+1 programs allow students to receive both bachelor and master degree of mechanical engineering in five years.

1) Program Overview

The Mechanical and Civil Engineering (MCE) Department at Purdue University Northwest (PNW) offers a 4+1 combined Bachelor of Science in Civil Engineering (BSCE) and Master of Science in Engineering (MSE) with a concentration in Civil Engineering degree program. The program allows students to receive both a BSCE and MSE degree in five years, as compared to six years needed to complete these degrees separately. It provides outstanding undergraduate students enrolled in the BSCE program with opportunities to continue their graduate studies toward a MSE degree. This enables them to broaden their studies and improve their career prospects with competitive advantage by completing both the BSCE and MSE degrees at an accelerated pace.

2) Degree Description

The BSCE+MSE combined curriculum consists of all required courses for the B.S. in Civil Engineering, in addition to all of the graduate course requirements for the traditional master's program. The traditional BSCE degree requires 122 credits and the MSE degree requires 30 credits, for a total of 152 credits. The combined program allows students to use 9 credits of graduate level courses approved by the Graduate Advisor or the Graduate Committee of the MCE Department to satisfy both the B.S. and M.S. graduation requirements, thereby reducing the number of required credits for the combined BSCE+MSE degree to 143 and making it possible for qualified students to complete both degrees in five years.

Students in this program will receive their BSCE degree upon completion of the undergraduate curriculum and their MSME degree later upon completion of the graduate curriculum requirements.

3) Thesis and Non-Thesis Options

The graduate portion of the combined program offers both thesis and non-thesis options. However, additional semesters may be required to complete a thesis research project.

4) Admission Requirements

The requirements for admission to the combined program are more stringent than the admission standards for the traditional Master of Science program. The admission process consists of the following two steps:

a) Initial Conditional Admission

Students should **start the application in their junior year after completion of 65 credits toward the BSCE**. Requirements for initial conditional admission:

- Current undergraduate student at PNW with a minimum of 65 credits toward BSCE degree
- Minimum 3.25 GPA
- B- or higher grade in all completed Civil Engineering core courses

b) Final Admission to the Graduate Program

After receiving conditional admission to the program, the student is required to submit a Plan of Study for the MSE degree. **Nine credits of graduate level courses**, which are used to satisfy both BSME and MSME degree requirements, must be identified on both the undergraduate and graduate Plan of Study and approved by the Graduate Advisor or the Graduate Committee of the MCE Department **prior to the last semester of the undergraduate study**. Final admission to the graduate program is determined after completion of all course requirements for the BSCE degree. Requirements for final admission to the graduate program:

- Minimum 3.25 overall GPA
- B- or higher grade in all Civil Engineering core courses
- B- or higher grade in each of the graduate courses (9 credits) approved for both B.S. and M.S. Plan of Study

4+1 Application Process

C. Post – Baccalaureate Studies

1. Engineering Project Management Graduate Certificate

Students can take individual courses for professional development without pursuing a graduate degree.

1) Certificate Requirements

The Graduate Certificate in Engineering Project Management can be earned by completing four courses (12 Credits) from the following graduate courses:

ME 51600 Advanced Engineering Project Management (required)	(3)
ME 54300 Advanced Engineering Economics (required)	(3)
ME 51500 Quality Control	(3)
ME 53200 Statistical Concepts in Engineering	(3)
ME 53400 Systems Engineering	(3)
STAT 51100 Statistical Methods (may be used instead of ME 53200)	(3)
MGMT 66000 Introduction to Operations Management	(3)

All courses taken for the certificate can be used for the Master of Science in Engineering degree if admitted to that program. Admission to the certificate program requires a Bachelor's degree in Engineering or approval of the Engineering Graduate Coordinator. An online application to the certificate program is required; please see the Graduate Studies website for the online application link.

IV. Electrical and Computer Engineering (ECE)

A. Basic Degree Programs in Electrical and Computer Engineering

1. Electrical and Computer Engineering, MSECE

The Master of Science in Electrical and Computer Engineering (MSECE) degree program requires a total of 30 credit hours to be completed, with thesis or non-thesis option. It is anticipated that the degree may be completed in two years of full time graduate study. To earn the MSECE degree, students must complete 30 credit hours, with a minimum cumulative graduate grade point average of 3.0 for the courses listed in the Plan of Study.

1) Assistantships

Teaching and research assistantships are available to qualified graduate students.

2) Course Requirements

One advanced mathematics course (3 credit hours) at the 50000-level taught by either the mathematics department or one of the engineering departments is required for both thesis and non-thesis options.

3) Thesis Option

Thesis option allows a student to earn credit for conducting independent research leading to a thesis. The thesis research is undertaken and completed under the supervision of a graduate faculty member and the thesis committee. The student's thesis committee is responsible for approving the research plan, monitoring progress and reviewing the thesis prior to acceptance.

Thesis option is normally available to students only after their completion of 9 credit hours with an overall grade point average of 3.0 or better in the degree program.

- 9 thesis research credit hours
- At least 21 credits of ECE primary graduate level engineering courses
- Six of thesis hours are considered as part of primary courses
- Minimum of 3 credit hours of graduate level mathematics course or equivalent with advisor approval
- Maximum of one independent study allowed as a related course in Plan of Study

4) Non-Thesis Option

The course requirements are divided into three categories:

- At least 21 credits of ECE primary graduate-level engineering courses
- Minimum of 3 credit hours of graduate level mathematics course or equivalent with advisor approval
- At most 6 credits of graduate-level courses in engineering, math, computer science, physics, chemistry, and biology with advisor approval
- Maximum of one independent study allowed as a related course in Plan of Study

5) List of Some Primary ME Courses

ECE 50100 - Introduction To Digital Processing Of Speech Signals	(3)
ECE 50201 - Information Theory	(3)

ECE 50500 - Networking Programming	(3)
ECE 50600 - Biomedical Instrumentation Design	(3)
ECE 50700 - Introduction To Biomedical Imaging	(3)
ECE 50900 - Advanced Electric Drives	(3)
ECE 51200 - Power Systems	(3)
ECE 51900 - Control Theory II	(3)
ECE 53201 - Power System Analysis	(3)
ECE 53500 – Adaptive Signal Processing with Applications	(3)
ECE 53800 - Digital Signal Processing I	(3)
ECE 54700 - Introduction To Computer Communication Networks	(3)
ECE 55000 - Computer Network Security	(3)
ECE 56800 - Digital Control Systems	(3)
ECE 56900 - Introduction To Robotic Systems	(3)
ECE 57400 - Software Engineering Methodology	(3)
ECE 58900 - State Estimation And Parameter Identification Of Stochastic Systems	(3)
ECE 59500 - Computer Graphics	(3)
ECE 59500 – Machine Learning	(3)
ECE 59500 – Big Data	(3)

6) List of Some Related Courses

ECE 50300 - Numerical Methods In Engineering	(3)
ECE 51400 - Advanced Engineering Economics	(3)
ECE 51600 – Advanced Engineering Project Management	(3)
ECE 52501 - Statistical Concepts In Engineering	(3)
ECE 52701 - System Engineering	(3)

2. Master of Science in Engineering (MSE), Interdisciplinary

Purdue University Northwest offers graduate Interdisciplinary Engineering leading to a Master of Science in Engineering degree. Courses are available in computer, electrical, mechanical, civil, metallurgical, and industrial engineering. The program has the flexibility to allow students to elect courses in one or several engineering disciplines. Teaching and research assistantships are available to qualified graduate students.

1) Special Admission Requirements

Bachelor's degree in Engineering from an institution accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Other students having adequate mathematical preparation with bachelor's degrees in non-engineering fields may be admitted on a conditional basis – they must complete 18-27 undergraduate credits in the engineering field of their choice with a GPA of 3.0/4.0 or better before being considered for full admission to the Master of Science in Engineering program.

Undergraduate GPA of 3.0/4.0 or better. Conditional admission may be granted to students with lower GPA's, with the stipulation that they must receive a grade of B or better for the first 9 credits of graduate work. Some students may be advised to complete prerequisite or additional courses which will not count toward their degree.

Post-baccalaureate admission. Students may enroll to meet individual needs for continuing

education rather than for pursuing a degree. Enrollment as a post-baccalaureate student does not imply later approval for degree-seeking status, nor does it guarantee acceptance toward a degree of credit taken as a post-baccalaureate student.

2) Total 30 Credits Required

Non-thesis Option:

- At least 18 credits of ME primary graduate-level engineering courses
- At most 12 credits of graduate-level courses in engineering, math, computer science, physics, chemistry, and biology with advisor approval
- Maximum of one independent study allowed as a related course in Plan of Study (effective Spring 2013)

Thesis Option:

- 21 credits plus 9 thesis credit hours
- Six of thesis hours are considered as part of primary courses
- Maximum of one independent study allowed as a related course in Plan of Study

B. 4+1 Combined Degree Programs

1. 4+1 Combined BSEE+MSECE Degree

The 4+1 programs allow students to receive both bachelor and master degree of electrical and computer engineering in five years.

1) Program Overview

The Electrical and Computer Engineering (ECE) Department at Purdue University Northwest (PNW) offers a 4+1 combined Bachelor of Science in Electrical Engineering (BSEE) and Master of Science in Electrical and Computer Engineering (MSECE). The program allows students to receive both a BSEE and MSECE degree in five years, as compared to six years needed to complete these degrees separately. It provides outstanding undergraduate students enrolled in the BSEE program with opportunities to continue their graduate studies toward a MSECE degree. This enables them to broaden their studies and improve their career prospects with competitive advantage by completing both the BSEE and MSECE degrees at an accelerated pace.

2) Degree Description

The BSEE+MSECE combined curriculum consists of all required courses for the B.S. in Electrical and Computer Engineering, in addition to all of the graduate course requirements for the traditional master's program. The traditional BSEE degree requires 120 credits and the MSECE degree requires 30 credits, for a total of 150 credits. The combined program allows students to use a maximum of 9 credits of graduate level courses approved by the Graduate Advisor or the Graduate Committee of the ECE Department to satisfy both the B.S. and M.S. graduation requirements, thereby reducing the number of required credits for the combined BSEE+MSECE degree to 141 and making it possible for qualified students to complete both degrees in five years.

Students in this program will receive their BSEE degree upon completion of the undergraduate curriculum and their MSECE degree later upon completion of the graduate curriculum requirements.

3) Thesis and Non-Thesis Options

The graduate portion of the combined program offers both thesis and non-thesis options. However, additional semesters may be required to complete a thesis research project.

4) Admission Requirements

The requirements for admission to the combined program are more stringent than the admission standards for the traditional Master of Science program. The admission process consists of the following two steps:

a) Initial Conditional Admission

Students should **start the application in their junior year after completion of 65 credits toward the BSEE**. Requirements for initial conditional admission:

- Current undergraduate student at PNW with a minimum of 65 credits toward BSEE degree
- Minimum 3.25 GPA
- B- or higher grade in all completed Electrical Engineering core courses

b) Final Admission to the Graduate Program

After receiving conditional admission to the program, the student is required to submit a Plan of Study for the MSECE degree. **Nine credits of graduate level courses**, which are used to satisfy both BSEE and MSECE degree requirements, must be identified on both the undergraduate and graduate Plan of Study and approved by the Graduate Advisor or the Graduate Committee of the ECE Department **prior to the last semester of the undergraduate study**. Final admission to the graduate program is determined after completion of all course requirements for the BSEE degree. Requirements for final admission to the graduate program:

- Minimum 3.25 overall GPA
- B- or higher grade in all Electrical Engineering core courses
- B- or higher grade in each of the graduate courses (9 credits) approved for both B.S. and M.S. Plan of Study

4+1 Application Process

2. 4+1 Combined BSCmpE+MSECE Degree

The 4+1 programs allow students to receive both bachelor and master degree of electrical and computer engineering in five years.

1) Program Overview

The Electrical and Computer Engineering (ECE) Department at Purdue University Northwest (PNW) offers a 4+1 combined Bachelor of Science in Computer Engineering (BSCmpE) and Master of Science in Electrical and Computer Engineering (MSECE). The program allows students to receive both a BSCmpE and MSECE degree in five years, as compared to six years needed to complete these degrees separately. It provides outstanding undergraduate students enrolled in the BSCmpE program with opportunities to continue their graduate studies toward a MSECE degree. This enables them to broaden their studies and improve their career prospects with competitive advantage by completing both the BSCmpE and MSECE degrees at an accelerated pace.

2) Degree Description

The BSCmpE+MSECE combined curriculum consists of all required courses for the B.S. in Electrical and Computer Engineering, in addition to all of the graduate course requirements for the traditional master's program. The traditional BSCmpE degree requires 122 credits and the MSECE degree requires 30 credits, for a total of 152 credits. The combined program allows students to use a maximum of 9 credits of graduate level courses approved by the Graduate Advisor or the Graduate Committee of the ECE Department to satisfy both the B.S. and M.S. graduation requirements, thereby reducing the number of required credits for the combined BSCmpE+MSECE degree to 143 and making it possible for qualified students to complete both degrees in five years.

Students in this program will receive their BSCmpE degree upon completion of the undergraduate curriculum and their MSECE degree later upon completion of the graduate curriculum requirements.

3) Thesis and Non-Thesis Options

The graduate portion of the combined program offers both thesis and non-thesis options. However, additional semesters may be required to complete a thesis research project.

4) Admission Requirements

The requirements for admission to the combined program are more stringent than the admission standards for the traditional Master of Science program. The admission process consists of the following two steps:

a) Initial Conditional Admission

Students should **start the application in their junior year after completion of 65 credits toward the BSCmpE**. Requirements for initial conditional admission:

- Current undergraduate student at PNW with a minimum of 65 credits toward BSCmpE degree
- Minimum 3.25 GPA
- B- or higher grade in all completed Computer Engineering core courses

b) Final Admission to the Graduate Program

After receiving conditional admission to the program, the student is required to submit a Plan of Study for the MSECE degree. **Nine credits of graduate level courses,** which are used to satisfy both BSCmpE and MSECE degree requirements, must be identified on both the undergraduate and graduate Plan of Study and approved by the Graduate Advisor or the Graduate Committee of the ECE Department **prior to the last semester of the undergraduate study**. Final admission to the graduate program is determined after completion of all course requirements for the BSCmpE degree. Requirements for final admission to the graduate program:

- Minimum 3.25 overall GPA
- B- or higher grade in all Electrical Engineering core courses
- B- or higher grade in each of the graduate courses (9 credits) approved for both B.S. and M.S. Plan of Study

4+1 Application Process

V. COMPUTER SCIENCE (CS)

Non-thesis option only.

A. Special Program Requirements

1. No more than six credits of coursework with a grade a grade of "C." 3.0 gpa must be maintained.

2. All courses taken as a temporary (non-degree) student must post grades of "A" or "B."

3. No more than two transfer courses (6 credit hours) accepted from other accredited universities may e used on a Plan of Study. Transfer courses must have a grade of B- or better to be eligible for transfer, and must be approved by the student's graduate advisor and the Chair of the graduate program. Courses used toward a degree at another institution do not qualify for transfer.

4. A maximum of 6 non-Computer Science credit hours may be accepted towards the degree only if they are in a related area as approved by the Computer Science faculty. Courses must be graduate level courses taken as graduate credit with a grade of 3.0 or higher.

B. Degree Requirements

1. Core Courses (9 credits)

- CS 51510-Algorithms
- CS 51520-Operating Systems
- CS 51530-Programming Languages, Interpreters and Compilers

2. Electives (21 credits)

Seven (7) approved courses at the graduate level. Courses must include at least 5 of the following CS courses (See **A.**4).

- CS 51540-Object Oriented Design
- CS 51550-Database Systems
- CS 51560-Software Engineering
- CS 51570-Computer Architecture
- CS 51580-Computer Graphics
- CS 51590-Parallel Computing

- CS 52510-Distrbuted Systems
- CS 52520- Software Design I
- CS 52530-Software Design II
- CS 52540-Data Mining, Machine Learning and Statistical Analysis
- CS 59000-Topics in Computer Science