Program Change Request

Date Submitted: 11/19/19 1:26 pm


Parent Plan: MAE, Electrical Engineering MS
Last approved: 05/14/19 8:22 am
Last edit: 01/29/20 10:50 am
Changes proposed by: jmlmolly

Catalog Pages Using this Program

Electrical Engineering: Signal Processing and Machine Learning, M.S.

Name of the school or college academic planner who you consulted with on this proposal.

Name
Sara Hagen - EGR

Proposal Abstract/Summary

Change the name of the program from 'Signal Processing and Machine Learning' to 'Machine Learning and Signal Processing'.

Changes to admissions language made in consultation with graduate school.

If approved, what terms should the proposed change be effective?

Fall 2020 (212)

Select if this proposal is only to add, remove, or rearrange curricular requirements, and will change less than 50% of the curriculum.

No

Basic Information

Program State: Active
Type of Program: Named Option
Parent Program: MAE, Electrical Engineering MS
Parent Audience: Graduate or professional
Parent Home Department: ELEC EGR
School/College: College of Engineering

The program will be governed by the home department/academic unit as specified. Will an additional coordinating or oversight committee be established for the program?

No

Parent is in the Graduate School?
Yes

SIS Code: SPML
SIS Description: Signal/Process & Machine Learn

Transcript Title: Machine Learning Signal Processing and Signal Processing Machine Learning

Will this name change apply to all enrolled students in the same term (turn-key)?

Yes

Named Options: POWER: Power Engineering
SPML: Signal Process & Machine Learn
382MS: PROF: Professional
382MS: SRCH: Research

Does the parent program offer this as an additional major as well? No

Roles by Responsibility: List one person for each role in the drop down list. Use the green + to create additional boxes.

<table>
<thead>
<tr>
<th>Role Type</th>
<th>Name (Last, First)</th>
<th>Email</th>
<th>Phone</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Director</td>
<td>Vanvlec, Barry D</td>
<td><a href="mailto:bvaneen@wisc.edu">bvaneen@wisc.edu</a></td>
<td>608/265-2488</td>
<td></td>
</tr>
<tr>
<td>Faculty Director</td>
<td>Malloy, Matthew L</td>
<td><a href="mailto:mmalloy@wisc.edu">mmalloy@wisc.edu</a></td>
<td>608/262-5505</td>
<td></td>
</tr>
<tr>
<td>Primary Contact</td>
<td>Malloy, Matthew L</td>
<td><a href="mailto:mmalloy@wisc.edu">mmalloy@wisc.edu</a></td>
<td>608/262-5505</td>
<td></td>
</tr>
<tr>
<td>Department Chair</td>
<td>Hagness, Susan C</td>
<td><a href="mailto:schagness@wisc.edu">schagness@wisc.edu</a></td>
<td>608/265-6739</td>
<td></td>
</tr>
</tbody>
</table>

List the departments that have a vested interest in this proposal.

- Computer Sciences (COMP SCI)
- Information School (I SCHOOL)
- Industrial and Systems Engr (IND SY EGR)
- Statistics (STATISTICS)
- Mechanical Engineering (MECH EGR)
- Engineering Professional Devlp (EGR P D)

Are all program reviews in the home academic unit up to date? Yes
Are all assessment plans in the home academic unit up to date? Yes
Are all assessment reports in the home academic unit up to date? Yes
Mode of Delivery: Face-to-Face (majority face-to-face courses)
Will this program be part of a consortial or collaborative arrangement with another college or university? No
Will instruction take place at a location geographically separate from UW-Madison? No
Parent has outside accreditation: No
Graduates of parent program seek licensure or certification after graduation: No
Year of three year check-in to GIHEC (3 years after first student enrollment): 
Year of first program review (5 years after first student enrollment): 

If this proposal is approved, describe the implementation plan and timeline.

Rationale and Justifications

How does the named option relate to the major and to other named options in the major, if relevant?

What is the rationale for this change?
The new name is a more accurate description of the program curriculum and will better serve the students as they enter a competitive job market.

What evidence do you have that these changes will have the desired impact?
A survey was shared with potentially impacted students. Out of 30 students, 17 responded to the survey as of 10/29/2019. Of the 17 students, 15 were in favor of the name change, while 2 preferred the current name. The two students who preferred the new name confirmed this was a minor preference, if any (please see emails in attached pdf).

The remaining three students were contacted via email and have now indicated that they are in favor of the name change (11/19/2019).

What is the potential impact of the proposed change(s) on enrolled students?
They will have the new name on their transcript.

What is the potential impact of the proposed change(s) on faculty and staff?
Documentation and marketing materials will have to be updated.

Faculty and Staff Resources

https://next-guide.wisc.edu/courseleaf/approve/?role=GRAD SCH Dept Approver
Resources, Budget, and Finance

Is this a revenue program? Yes
What is the tuition structure for this program?
Standard resident/VM/nonresident graduate tuition

Provide an overview of plans for funding the program including but not limited to program administration, instructional/curricular delivery, technology needs and program assessment.

Given considerations associated with the proposed change, describe the academic unit's fiscal capacity to support the instructional and curricular requirements, academic and career advising, student support services, technology needs, and relevant assessment of student learning and program review requirements. Is there sufficient capacity in the curricular and academic support services to meet the additional workload for research graduate programs, include information on how the program will be administered and how student funding will be handled. For undergraduate programs, include information on academic advising, career advising, student support services.

Does the program or change require substantial new resources other than those just described? Describe the needs. Confirm that the dean is committed to providing the resources.

Curriculum and Requirements

If you are proposing a change to the curriculum, what percentage of the curriculum is changing?

Parent Plan Admissions/How To Get In Requirements

Students apply to the Master of Science in Electrical Engineering through one of the named options:
Research
Professional
Machine Learning and Signal Processing
Power Engineering (Online)

Guide Admissions/How to Get In tab

Approved Shared Content from /shared/graduate-school-admissions/

Last Approved: Oct 16, 2019 6:46pm

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. Applicants must meet the minimum requirements of the Graduate School as well as the program(s). Once you have researched the graduate program(s) you are interested in, apply online.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>This program does not admit in the spring.</td>
</tr>
<tr>
<td>Summer Deadline</td>
<td>This program does not admit in the summer.</td>
</tr>
<tr>
<td>GRE (Graduate Record Examination)</td>
<td>Required.**</td>
</tr>
<tr>
<td>GRE (Graduate Record Examination)</td>
<td>Required.*</td>
</tr>
<tr>
<td>English Proficiency Test</td>
<td>Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements: <a href="https://grad.wisc.edu/apply/requirements/english_proficiency">link</a>.</td>
</tr>
<tr>
<td>Other Tests (e.g., GMAT, MCAT)</td>
<td>n/a</td>
</tr>
<tr>
<td>Letters of Recommendation Required</td>
<td>3</td>
</tr>
</tbody>
</table>

*Applicants who have earned, or will be earning before the start of the program, a bachelor's degree from UW-Madison are exempt from submitting a GRE test score.

A submitted online application is required, consisting of:
Resume/CV
Statement of purpose; see purpose (see the suggested guidelines provided by the Graduate School); School(s)
Most up to date unofficial transcripts from all previous higher education institutions, regardless of whether or not a degree was earned (official transcripts are requested of only recommended applicants); International academic records must be in the original language accompanied by an official English translation.

Payment: payment of the one-time application fee of $75. Test scores and Applicants must also obtain three letters of recommendation as detailed above, for consideration.

Applications must be entirely complete by Please note that is highly advised to take the deadline, including test scores and letters TOEFL/IELTS test in advance of recommendation. Please note that it is highly advised to take the GRE and TOEFL/IELTS tests well in advance of the application deadline in order to ensure time for receiving and analysis of the scores. Please do not mail any paper copies of application materials, except IELTS test scores. They will not be reviewed.

Information for international students, including proof of funding and visa information, can be found on the Graduate School's website: [link](https://grad.wisc.edu/international-students).

An applicant must have a bachelor's degree from a regionally accredited U.S. institution or a comparable degree from an international institution. International applicants can find specific information for their country on the Graduate School Admission Requirements page. The department welcomes applications from scientific, engineering, and mathematical disciplines other than ECE. ECE applicants with a bachelor's degree may apply directly to the Ph.D. program.

*Complete applications received by December 15 are guaranteed to be reviewed, but applications are welcome as space is available.
**Applicants who have earned, or will be earning before starting the program, a bachelor's degree from UW-Madison are exempt from submitting a GRE test score.

Reentry admissions

If you were previously enrolled as a graduate student at UW–Madison, but have had a break in enrollment for at least one fall or spring semester, you will need to apply to return your studies.

For applicants previously enrolled in a graduate program other than ECE, you must complete a new online application, including all materials, for admission.

For applicants previously enrolled in ECE as a graduate student, you must complete a reentry application. Admission requirements are preferred that applicants should have a B.S. degree in Electrical and Computer Engineering or a related area. A graduate program average of B+ will count in the minimum requirement for admission reconsideration. Applicants from an international institution must demonstrate strong academic...
In order to apply as a reentry applicant, you must:

- complete the online application (https://apply.grad.wisc.edu), including the personal information section, program and term selection, and supplementary application;
- upload a CV/resume in the application portal;
- upload a statement of purpose*** in the application portal;
- upload any new unofficial transcripts from previous higher education institutions, excluding UW-Madison; and
- submit three letters of recommendation if the break in enrollment equals or is greater than four semesters (Fall, Spring).

Letters of recommendation should be emailed directly to the ECE Graduate Admissions Team (ecegradadmission@engr.wisc.edu) from the recommender at ecegradadmission@engr.wisc.edu.

These are no Spring or Summer admission cycles. Only completed applications, including supporting materials, by the application deadline are guaranteed consideration. Please note that it is highly advisable to take the GRE and TOEFL tests well in advance of the deadline to ensure time for receiving and processing the tests. If the reentry applicant is unable to upload any of the additional required materials, please email them to the ECE contact at the ECE Graduate Admissions Team (team@ecegradadmission@engr.wisc.edu).

### Current graduate student Admissions

Students currently enrolled as a graduate student at UW-Madison, whether in or other than ECE, wishing to apply to this degree program should contact the ECE Graduate Admissions Team at ecegradadmission@engr.wisc.edu to inquire about the process and respective deadlines several months in advance of the anticipated enrollment term. Current students may apply to change or add programs for any term (Fall, Spring, or Summer).

### Questions?

Please review the frequently asked questions answered by the Graduate School [here](https://www.grad.wisc.edu/admissions/apply/faq).

If you have any admissions questions, please do not hesitate to contact the ECE Graduate Admissions Team at ecegradadmission@engr.wisc.edu.

Those who are not familiar with using the HTML editor fields may upload a document with information about the curriculum for use by those who will format and edit the content that will appear in the Guide.

### Parent Requirements

Approved Shared Content from /shared/graduate-minimum-degree-requirements-and-satisfactory-progress/

Approved Shared Content from /shared/graduate-school-module-instruction-definitions/

<table>
<thead>
<tr>
<th>MODE OF INSTRUCTION</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>See Named Option</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CURRICULAR REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>University General Education Requirements</strong></td>
</tr>
<tr>
<td>Requirements</td>
</tr>
<tr>
<td>Minimum Credit Requirement</td>
</tr>
<tr>
<td>Minimum Graduate Coursework</td>
</tr>
</tbody>
</table>
Overall Graduate GPA Requirement: 3.00 GPA required.

Other Grad Requirements: See individual named option page in Guide for more information on grade requirements.

Assessments and Examinations: See individual named option page in Guide for more information on assessment and examination requirements.

Language Requirements: Non-native speakers of English who enroll in the M.S. program must take the ESLAT test on arrival at the university and then take any recommended courses based on the exam results. In addition, if a student’s advisor believes that his or her technical writing ability needs improvement, the student may be required to undertake remedial work.

**Required Courses**

Select a named option for courses required.

**Named Options (Sub-Majors)**

A named option is a formally documented sub major within an academic major program. Named options appear on the transcript with degree conferral.

**Electrical Engineering: Power Engineering, M.S.**

**Electrical Engineering: Professional, M.S.**

**Electrical Engineering: Research, M.S.**

**Electrical Engineering: Signal Processing and Machine Learning, M.S.**

**Approved Shared Content from /shared/graduate-minimum-degree-requirements-and-satisfactory-progress/**

Last Approved: Oct 25, 2018 11:29am

**Minimum Graduate School Requirements**

Review the Graduate School minimum academic progress and degree requirements, in addition to the program requirements listed below.

**Named Option Requirements**

**MODE OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Mode of Instruction</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Mode of Instruction Definitions:

- **Face to Face**: These programs are offered in a face-to-face format. Contact the program for more information.
- **Evening/Weekend**: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the evening schedule of a specific program, contact the program.
- **Online**: These programs are offered primarily online. They allow you to complete the program at your own pace and from anywhere in the world. For more information about the online nature of a specific program, contact the program.
- **Hybrid**: These programs combine online and on-campus courses. Hybrid programs are designed to provide flexibility and convenience. For more information about the hybrid schedule of a specific program, contact the program.
- **Accelerated**: These programs are offered in an accelerated format that allows you to complete your program in a condensed time frame. For more information about the accelerated nature of a specific program, contact the program.

**Approved Shared Content from /shared/graduate-school-mod-e-instruction-definitions/**

Last Approved: Oct 25, 2018 11:30am

- **Evening/Weekend**: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the evening schedule, contact the program.
- **Online**: These programs are offered primarily online. They allow you to complete the program at your own pace and from anywhere in the world. For more information about the online nature of the program, contact the program.
- **Hybrid**: These programs combine online and on-campus courses. Hybrid programs are designed to provide flexibility and convenience. For more information about the hybrid schedule, contact the program.
- **Accelerated**: These programs are offered in an accelerated format that allows you to complete your program in a condensed time frame. For more information about the accelerated nature of the program, contact the program.

**CURRICULUM REQUIREMENTS**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Credit Requirement</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Resident Credit Requirement</td>
<td>16 credits</td>
</tr>
<tr>
<td>Minimum Graduate Coursework</td>
<td>Half of degree coursework (15 credits out of 30 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide <a href="https://registrar.wisc.edu/course-guide/">here</a>.</td>
</tr>
<tr>
<td>Overall Graduate GPA Requirement</td>
<td>3.00 GPA required.</td>
</tr>
<tr>
<td>Other Grad Requirements</td>
<td>1. A grade of B or better in any graduate course is acceptable. 2. A grade of B or C in an ECE course is acceptable, provided the total cumulative GPA for graduate ECE courses is greater than or equal to 3.00. 3. A grade of B or C in a non-ECE course is acceptable only if approved by the Graduate Committee.</td>
</tr>
<tr>
<td>Assessments and Examinations</td>
<td>A specified course sequence must be completed.</td>
</tr>
<tr>
<td>Language Requirements</td>
<td>Non-native speakers of English who enroll in the M.S. program must take the ESLAT test on arrival at the university and then take any recommended courses based on the exam results. In addition, if a student’s advisor believes that his or her technical writing ability needs improvement, the student may be required to undertake remedial work.</td>
</tr>
</tbody>
</table>
## Required Courses

### Fall Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 431</td>
<td>Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>ECE 436</td>
<td>Communication Systems I</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/ SYS E 524</td>
<td>Introduction to Optimization</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/ME 532</td>
<td>Matrix Methods in Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI 533</td>
<td>Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/ME 539</td>
<td>Introduction to Artificial Neural Network and Fuzzy Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECE 717</td>
<td>Linear Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECE 729</td>
<td>Information Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECE 730</td>
<td>Probability and Random Processes</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI 761</td>
<td>Mathematical Foundations of Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>ECE 901</td>
<td>Special Topics in Electrical and Computer Engineering</td>
<td>1-3</td>
</tr>
<tr>
<td>E.P.D 611</td>
<td>Engineering Economics and Management</td>
<td>3</td>
</tr>
<tr>
<td>E.P.D 612</td>
<td>Technical Project Management</td>
<td></td>
</tr>
</tbody>
</table>

### Spring Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 437</td>
<td>Communication Systems II</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/ SYS E 524</td>
<td>Introduction to Optimization</td>
<td>3</td>
</tr>
<tr>
<td>ECE 719</td>
<td>Optimal Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECE 729</td>
<td>Signal Synthesis and Recovery Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ECE 736</td>
<td>Wireless Communications</td>
<td>3</td>
</tr>
<tr>
<td>ECE 738</td>
<td>Advanced Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>ECE 830</td>
<td>Estimation and Decision Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/STAT 861</td>
<td>Theoretical Foundations of Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>ECE 901</td>
<td>Special Topics in Electrical and Computer Engineering</td>
<td>1-3</td>
</tr>
<tr>
<td>E.P.D 617</td>
<td>Communicating Technical Information</td>
<td>3</td>
</tr>
</tbody>
</table>

### Summer

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 697</td>
<td>Capstone Project in Signal Processing and Machine Learning</td>
<td>5</td>
</tr>
<tr>
<td>ECE 701</td>
<td>Graduate Cooperative Education Program 3</td>
<td>1-2</td>
</tr>
</tbody>
</table>

3 Up to two credits of ECE 702 (Co-op) may count towards this degree.

ECE 610 Seminar in Electrical and Computer Engineering requirement.

All on-campus ECE graduate students must register for ECE 610 during their first semester of graduate studies. M.S.-degree seeking students must take 1 credit of ECE 610 in the fall semester of which they are entering the program. Students with a course conflict with ECE 610 should discuss with their faculty advisor regarding an exception to the requirement.

The purpose of ECE 610 is to expose students in their first semester of graduate school to various areas within ECE and to areas outside of ECE to which ECE has or could have connections, e.g., biotechnology, physics, mathematics, business, software. Electrical and computer engineering is very interdisciplinary in nature, and so it is important that students be aware of state-of-the-art research in areas other than their own.

Total credits required:

Parent Plan Graduate Policies

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Approved Shared Content from /shared/graduate-school-policies/

Last Approved: Oct 25, 2018 11:30am

Graduate School Policies

The Graduate School's Academic Policies and Procedures provide essential information, regulations, and policies to students. Students must read and understand them to ensure they are in compliance with Wisconsin's academic policies.