Three-Year Check-In for New Programs:

The creation and maintenance of graduate programs and certificates represents significant resource commitments by faculty and staff. Given these investments, in 2014 the Graduate Faculty Executive Committee (GFEC) established a “check in” process for newly approved programs and certificates prior to their first formal university review (which occurs in the fifth year.) Through this “check-in,” the GFEC hopes program faculty and staff will assess the implementation of their new program and determine what mechanisms may be needed for sustained student success. Progress reports will be included on GFEC agendas, and program representatives may be asked to attend GFEC if additional information is requested. In the interest of brevity, please keep responses to 300 words or less.

Program Name
Master of Engineering : Engineering Data Analytics (MEDA)

Term of First Enrollments
2017

Check-In Completed By
Susan R Ottmann

Date Completed
10/28/2020

Academic Quality and Student Success

1. Provide an update on any changes to the program’s curriculum and learning outcomes. Include a description of the program’s typical course modalities (face-to-face, online, asynchronous discussion, team or individual assignments) and if courses have evolved based on faculty or student feedback.

The MEDA program is 100% online with 15 core credits required in Data Analytics and 15 credits from options in which the students choose from additional data-related courses or from other courses offered by the College of Engineering online. Students commonly choose courses in Engineering Management and/or Manufacturing Systems.

Courses offered in the MEDA program have a combination of individual and team assignments with some courses incorporating individual and team projects. The suite of courses has been expanded based on student feedback. A course in Interactive Data Visualization (ISyE 649) has recently been added, as well as a course in Simulation and Analysis (ISyE 620). The program is also strengthened by LIS 751 Database Design, which comes from the school of Library Science. Courses in this program are inter-disciplinary across the College of Engineering, taught by Mechanical Engineering, Electrical and Computer Engineering and Industrial Systems.
Engineering. A new course in Statistics and Machine Learning for Engineering Applications will be developed Spring 2021 and offered Spring 2022.

2. Briefly explain the program’s learning outcomes assessment plan and discuss how you are or how you plan to evaluate student learning. Summarize any data collected to date showing evidence of student learning.

Student Learning Goals
1. Demonstrate a strong background in engineering principles and a thorough knowledge of the latest engineering principles in the field.
2. Demonstrate practical engineering experience that will be immediately applicable in the workplace.
3. Demonstrate an ability to formulate, analyze, and solve advanced engineering problems.
4. Demonstrate creative, independent problem-solving skills.
5. Apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools to these problems.
6. Employ knowledge and practice of career-enhancing competencies that enhance professional opportunities and personal success.
7. Recognize and apply principles of ethical and professional conduct.

Data is collected through assessment of individual assignments and course performance as well as individual interviews with graduating students. The required courses mapped to the learning goals are shown below.

<table>
<thead>
<tr>
<th>Degree Program Required Courses or Experiences</th>
<th>Learning Goal #1: Demonstrate a strong background in engineering principles and a thorough knowledge of the latest engineering principles in the field</th>
<th>Learning Goal #2: Demonstrate practical engineering experience that will be immediately applicable in the workplace.</th>
<th>Learning Goal #3: Demonstrate an ability to formulate, analyze, and solve advanced engineering problems</th>
<th>Learning Goal #4: Demonstrate creative, independent problem solving skills</th>
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<tbody>
<tr>
<td>ME 459: Computing Concepts for Applications in Engineering</td>
<td>X</td>
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<td>ME 759: High Performance Computing for Applications in Engineering</td>
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<tr>
<td>ME 548 Introduction to Design Optimization</td>
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<td>X</td>
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<tr>
<td>ECE 532: Matrix Methods in Machine Learning</td>
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<td>X</td>
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<tr>
<td>ISyE 412: Fundamentals of Industrial Data Analytics</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>LIS 751 – Database Design for Information Professionals</td>
<td></td>
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<td>X</td>
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</tbody>
</table>
3. The GFEC is interested to learn how departments balance faculty and staff teaching loads and responsibilities between new and existing programs. Discuss how the department or program is achieving balance, and what challenges supporting multiple programs may have created for teaching, student services, advising or funding. Also of interest is information on what if any assets are shared between programs, or additional benefits that have been realized.

The program engages faculty from the College of Engineering (COE) Departments of Mechanical Engineering (ME), Electrical and Computer Engineering (ECE), and Industrial Systems Engineering (ISyE). Additional courses are provided through the Office of Engineering Professional Development (OEPD). OEPD works with the Department Chairs and their designees and faculty members to plan courses and balance requirements. TAs help with grading and in some courses conduct additional synchronous office hours. Courses often run during the same semester both on- and off-campus to enable shared resources and faculty/instructor efficiency. For larger course sections, teaching may be counted as part of a faculty member’s teaching load.

4. Please describe how your program has ongoing and broad faculty commitment, including governance, to ensure its continued success. If applicable, reflections from faculty and staff can be included here or as an appendix. Also consider if implementation of this program is supporting the Department and/or School/College’s current strategic goals.
The program has faculty support through academic advisors from the departments of Mechanical Engineering (ME) and Electrical and Computer Engineering (ECE). Prof. Dan Negrut was instrumental in the launch of the program and teaches 2 courses in the core curriculum. Prof. Barry Van Veen, Associate Chair for Graduate and Online Studies for ECE, serves as a faculty advisor and he developed and teaches a key course in the program. Letters of support are attached.

This program aligns with UW-Madison and COE strategic goals to grow online professional master’s programs. It directly supports the Wisconsin Idea and has strong continued support from COE, OEPD and the Division of Continuing Studies.

**Operations and Administration**

5. Explain how the program has either brought in NEW and ADDITIONAL students (required for non-pooled programs), and/or how overall enrollment in your related programs has remained steady. If unanticipated overlap with existing programs has resulted, discuss steps to mitigate the overlap.

*Non-pooled programs should provide a brief narrative explanation along with the updated budget template populated with data from the past 3 years. This updated budget template will also be reviewed by the Program Revenue Budget Committee.*

The differentiator of this program is its focus on Data Analytics through an engineering lens. In addition, students are working engineers seeking to improve their skills and advance their careers through additional learning of tools, techniques, and capabilities. Students in this program may also access courses from other engineering professional programs but are specifically interested in data analytics and data science in engineering.

6. Funding Considerations

   a. For traditional/pooled programs – How is the program successfully funding its students?

   b. For non-pooled programs – Refer to the updated budget template in addressing if the program has sufficient enrollment for sustainability. Discuss the current market outlook compared to the original marketing study and plans to grow or change the program to become sustainable.

The program enrolled 14 new students in the first year and has 24 total students enrolled Fall 2020 (FY21). The program has had several changes in leadership with Susan Ottmann taking responsibility FY21. The sudden and untimely death of the prior program director impacted the
enrollment and recruitment numbers. There is a high level of interest in the program and, with a few changes in curriculum, we are confident we can grow the program to the original expectations.

Enrollment Numbers (Total Students)

<table>
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<th></th>
<th>FY18</th>
<th>FY19</th>
<th>FY20</th>
<th>FY21</th>
<th>FY22</th>
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<tr>
<td></td>
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Financials

<table>
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<tr>
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<th>2019</th>
<th>2020</th>
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</thead>
<tbody>
<tr>
<td>Revenue</td>
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<td>284570</td>
<td>291303</td>
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<tr>
<td>Expenses</td>
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<td>166631</td>
<td>288759</td>
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<tr>
<td>Net</td>
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<td>35732</td>
<td>117939</td>
<td>2544</td>
</tr>
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</table>

- Expenses in 2020 included additional $12,071 Campus Tax, $37,593 in additional Course Development, $28,159 for additional Program Director Expenses

7. If the program admits international students, describe how program processes address length of stay visa issues, online course restrictions, and needing ESL services.

Although there is interest from international students and strong potential to serve international markets, to date there have been no international students enrolled.

8. Are there any issues impacting the program’s long-term sustainability? If so, what support would you like to help you succeed?

There are no issues impacting the long-term sustainability. There are competitive programs from other institutions, but we are confident that the prospects for this program are very strong. Recent adjustments to the curriculum and broader faculty engagement, the reputation of the College and UW-Madison, demand for engineers with these skillsets, and increasing support from other academic units all indicate the potential for growth. This program also is part of a strong portfolio of graduate professional programs and it attracts students to our other online engineering master’s programs and shares courses with other UW-Madison online engineering degrees.
Appendix 1

October 19, 2020

Susan Ottnann
Program Director
College of Engineering
UW-Madison

Dear Susan:

I heartily support the Master of Engineering: Engineering Data Analytics degree program. With the need for engineers and technical managers to make timely decisions using exponentially increasing amounts of available data, this program has never been more important. The program’s focus on both depth in analytical skills and breadth across engineering focus areas—as well as flexibility in available coursework—make it an ideal option for those seeking to excel in today’s increasingly complex and technology-driven business world.

At the same time, from the perspective of collaboration across academic units within the College of Engineering and UW, the future has never been brighter for such an interdisciplinary program. Recent developments in the College are leading to additional course options for online delivery, and we have made it possible for academic departments to benefit from online course offerings in a variety of ways. Looking ahead, all of these factors can be expected to yield enrollment growth and increased engagement among our best faculty in this and other professional master’s programs.

I look forward enthusiastically to working with you and other colleagues who lead related efforts in the College’s academic departments (and others across Campus) to make this program an even more important part of our offerings to advance our goals for students, Wisconsin, and the world.

Sincerely,

Edward G. Borbely
Associate Dean

Edward G. Borbely
College of Engineering
Interdisciplinary Professional Education   2610 Engineering Hall   1415 Engineering Drive   Madison, WI 53706
To Whom It May Concern:

The stated purpose of this letter is to indicate my strong commitment to the success of the MEDA program, as well as to express my belief that this program answers a clear and present need for educating professionals for emerging jobs in a high demand field.

I am responsible for teaching two core classes in the MEDA program – ME459 “Computing Concepts for Applications in Engineering”, and ME759 “High Performance Computing for Applications in Engineering.” These are classes that have both face-to-face (pooled and non-pooled) students, and MEDA students. I really enjoy working with these groups of students – they each have something to bring to the table. While the face-to-face students are quicker and more spontaneous, the MEDA students are more mature, committed, and diligent in learning new material.

The last seven months of COVID19 pandemic has provided ample opportunities to reflect on the role that I can play in the education of my students. I think that the type of lecturing I deliver now, which engages similarly on-campus and off-campus students, works and it benefits the students. There are small things that can be improved but I think the students are comfortable asking questions, participating in the virtual lectures, and they benefit from the availability of the live lecture recording as it gives them the opportunity to go back and listen to the lecture discussion. This bodes well for programs such as MEDA, who engage remote students.

If there is one issue of concern, is tied to the TA support. This is an issue that does not have to do with MEDA but our collective and ongoing effort in CoE to engage more distance learning students. EPD is going through a thorough shake up. We should make sure the TA support is there so that the non-face-to-face students get the support that they need, which is in many cases higher than that required by the younger, face-to-face students.

It has been an awesome experience to work with my great EPD colleagues and I look forward to continuing this worthwhile experience in the future.

Please don’t hesitate to contact me should you have question regarding my statements above.

Sincerely,

Dan Negrut

October 21, 2020
To Whom It May Concern:

I am delighted to express my strong support for the MEDA program. Engineering data analytics is a very high demand field and the program serves an important role educating students that are in the workforce. The need for data analytics skills has sky-rocketed in recent years and is a topic that was not emphasized in engineering education until recently. Consequently, many working engineers have a need to develop skills in this area. The MEDA program serves a key role in enabling mid-career engineers to pick up these skills while they continue to work.

My familiarity with the MEDA program is via several different avenues. First, I developed an online version of CS/ECE/ME 532 specifically for MEDA students and first taught it to them in Fall of 2019. I also serve as the Associate Chair for Graduate and Online Studies in ECE and have been coordinating online offerings between ECE and former Engineering Professional Development programs like MEDA. Finally, I serve on the College of Engineering Interdisciplinary Professional Education Advisory Committee which helps oversee MEDA and similar programs.

The challenge of finding faculty to teach in non-departmental programs like MEDA has been a limiting growth factor in the past. However, the COVID pandemic has greatly increased the number of faculty that are experienced with online instruction. In addition, the administrative move of the Department of Engineering Professional Development into an office in the College of Engineering has positioned the MEDA program to better engage faculty in the various departments that contribute courses to the program.

These factors, combined with exponential growth in demand for data analysis skills, portends a bright future for the MEDA program. Demand for data analytics skills has far exceeded the expectations at the time the program was proposed. Thus, I am convinced that MEDA has the potential to significantly exceed the original expectations for serving students and industry.

Feel free to contact me if you have any questions.

Sincerely,

Barry Van Veen
Lynn H. Matthias Professor
Associate Chair for Graduate and Online Studies

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bvanveen@wisc.edu www.engr.wisc.edu/cce