New Curriculum or Curricular Change EFD Template



College of Engineering

Engineering Faculty Document No.: EFD#96-26 December 5, 2025

TO: The Engineering Faculty

FROM: The Faculty of the School of Mechanical Engineering

RE: New Engineering Combined Degree Program

The Faculty of the School of Mechanical Engineering has approved the following new combined degree program (BSMSPE/MSME) from the College of Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

TITLE:

Combined BSMSPE/MSME in Motorsports Engineering

DESCRIPTION:

The School of Mechanical Engineering (ME) at Purdue, West Lafayette, IN proposes an integrated, five-year, combined BSMSPE/MSME degree program in which the students will receive both a BS in Motorsports Engineering and a MS in Mechanical Engineering. By providing a seamless transition from the BSMSPE to the MSME curriculum, the students who graduate from this program will meet all the BSMSPE and MSME requirements. The availability of the combined-degree program will significantly enhance the recruitment and retention of Purdue undergraduates for graduate studies, and even possibly a doctorate in engineering. This new combined degree program will expand on the current BSME/MSME combined degree program that ME already offers.

RATIONALE:

he combined BSMSPE/MSME degree programs differ from the two traditional degree programs taken consecutively because of the five-year timeline for the completion of the program, which reduces the time typically taken for the two degrees separately by one year. Such a program will provide a very important and highly desired option to superior students who are oriented towards developing stronger technical skills and a broader knowledge base than they would develop through exposure to the traditional BSMSPE curriculum alone. This will also prepare graduates interested in pursuing either technical and research careers in industry or further graduate education towards a doctorate. The five-year duration is a natural outcome of combining the traditional programs and accelerating the educational process by substituting graduate-level courses for undergraduate electives. Furthermore, the feature of the traditional program, i.e., the flexibility in the BSMSPE program that allows students to take graduate level courses in their senior year, has also been exploited. This will allow a student to take graduate level courses in the 4th year of the combined-degree program, thereby meeting the ME elective course requirements for the degree of BSMSPE and simultaneously meeting the course requirements of the MSME. The program is geared towards those students who demonstrate the commitment, and the academic

ability, to be successful in the program. Therefore, it is anticipated that only the most highly motivated students would be counseled to enter the combined-degree program.

What poll

Head/Director of the School of Mechanical Engineering

Link to Curriculog entry:

https://purdue.curriculog.com/proposal:35046/form

PROPOSAL

for a

FIVE-YEAR COMBINED DEGREE PROGRAM

BACHELOR OF SCIENCE IN MOTORSPORTS ENGINEERING

and

MASTER OF SCIENCE IN MECHANICAL ENGINEERING

TO BE OFFERED BY THE SCHOOL OF MECHANICAL ENGINEERING

in the

COLLEGE OF ENGINEERING

PURDUE UNIVERSITY
WEST
LAFAYETTE/INDIANAPOLIS
LOCATIONS

Proposal for a Five-Year Combined BSMSPE/MSME Degree Program in Mechanical Engineering at Purdue, West Lafayette/INDIANAPOLIS

Objective: The School of Mechanical Engineering (ME) at Purdue, West Lafayette, IN proposes an integrated, five-year, combined BSMSPE/MSME degree program in which the students will receive both a BS in Motorsports Engineering and an MS in Mechanical Engineering. By providing a seamless transition from the BSMSPE to the MSME curriculum, the students who graduate from this program will meet all the BSMSPE and MSME requirements. The availability of the combined-degree program will significantly enhance the recruitment and retention of Purdue undergraduates for graduate studies, and even possibly a doctorate in engineering. This new combined degree program will expand on the current BSME/MSME combined degree program that ME already offers.

Background: Purdue University has a strong commitment to teaching and research. Consistent with this, the proposed program will provide students an opportunity to develop a more advanced knowledge base in their areas of interest as well as an opportunity for cutting-edge supervised research. Both thesis-option and non-thesis option programs at the master's level will be made available. The additional benefit is that the two degrees together would be completed in a shorter time than it normally takes to pursue the degrees separately. The program is a fully integrated five-year curriculum, including undergraduate and graduate level courses, which will aid the students in developing a frame of mind and a set of tools that enable them to apply fundamental engineering principles to solve real world advanced engineering problems. A graduate degree is also becoming highly desirable and even an essential requirement as many companies expect graduates to be able to contribute to engineering and development in the globally competitive environment. Over the last few years, a strong demand has also arisen for combined BS/MS programs with Purdue's global engineering partners where students are gaining significant expertise in global collaborative design efforts and training.

By the nature of its structure, the program will require undergraduate students to make an early commitment to graduate studies; thereby raising the odds that highly motivated students will come to the program. It is important to note that the design of the program is such that if a student in the five-year program should have a change of heart, the student will still be able to complete the requirements for a traditional BSMSPE in four years.

The proposed program will benefit the ME graduate program by adding an extra channel of recruitment of Purdue undergraduates to graduate studies. The caliber of students recruited is likely to be very high because they would have demonstrated an early commitment to the pursuit of a graduate degree and maintained a good academic record. In the last couple of years, honors programs have also been introduced in the College of Engineering for highly talented and high

achieving undergraduates. It is essential that these students be provided avenues for continued engagement and growth. Therefore, it is anticipated that the availability of the combined BSMSPE/MSME degree program will enhance the graduate program.

Justification: The combined BSMSPE/MSME degree program differs from the two traditional degree programs taken consecutively because of the five-year timeline for the completion of the program, which reduces the time typically taken for the two degrees separately by one year. Such a program will provide a very important and highly desired option to superior students who are oriented towards developing stronger technical skills and a broader knowledge base than they would develop through exposure to the traditional BSMSPE curriculum alone. This will also prepare graduates interested in pursuing either technical and research careers in industry or further graduate education towards a doctorate.

The five-year duration is a natural outcome of combining the traditional programs and accelerating the educational process by substituting graduate-level courses for undergraduate electives. Furthermore, the feature of the traditional program, i.e., the flexibility in the BSMSPE program that allows students to take graduate level courses in their senior year, has also been exploited. This will allow a student to take graduate level courses in the 4th year of the combined-degree program, thereby meeting the ME elective course requirements for the degree of BSMSPE and simultaneously meeting the course requirements of the MSME. The program is geared towards those students who demonstrate the commitment, and the academic ability, to be successful in the program. Therefore, it is anticipated that only the most highly motivated students would be counseled to enter the combined-degree program.

Features:

- 1. The proposed curriculum includes <u>all</u> the core undergraduate courses that are currently required of BSMSPE majors and <u>all</u> the current graduate course requirements of the traditional ME Master's program.
- 2. Students will be required to maintain a minimum GPA of 3.4 for the first 81 credit hours of coursework (normally the end of fifth semester) in the plan of study to be conditionally admitted to the program. This is more stringent than the current admission requirements for the MSME program.
- 3. The total credit hours required for this combined-degree program will be 146 hours. For reference, the traditional BSMSPE requires 128 hours, and the MSME requires 30 hours, for a total of 158 hours. The integrated program is structured to provide an overlap of 12 credit hours, thus reducing the number of required hours to 146.
- 4. Students will be admitted to the School of ME under the guidelines that currently exist for admitting traditional BSMSPE students. The sequence of courses that they will take for the first six semesters will be identical to the courses taken by the traditional BSMSPE students. The students would be made aware of the option to pursue the combined BSMSPE/MSME program during their first (or second year) and students will need to submit an application to the combined program in their sixth semester of their undergrad program, if they wish to pursue it.
- 5. There will be two plans of study for students in this program: 1) a BSMSPE plan of study that will be filed no later than one semester before completing the BSMSPE degree requirements (normally in seventh semester), including the 12 credit hours of graduate courses to be taken as the four technical electives, and 2) an MSME plan of study that

- will be completed after the completion of the BSMSPE plan of study (submitted in the ninth semester), which will include the four graduate courses (12 credit hours) already taken and listed on the BSMSPE plan of study.
- 6. Granting of the BSMSPE diploma will be awarded once the BSMSPE required coursework is completed. A semester-by-semester distribution of the courses is also attached.
- 7. The final admission to the graduate program will not be made unless the student meets the minimum 3.20 GPA requirement and receives at least a B grade in each of the four graduate courses in the student's BSMSPE plan of study.
- 8. A minimum GPA of 3.00 will be required in the MSME plan of study for graduation, as in the traditional Master's program. The master's GPA does not include the grades of four graduate co-counted courses transferred from the BSMSPE plan of study. In Table 1 is shown an outline of the timeline and the milestones in the program.
- 9. The program is designed such that a student in the program will be able to switch to the traditional BSMSPE at any time to receive a BSMSPE degree. A student who is initially in the combined BSMSPE/MSME program but then opts out at the end of the seventh or eighth semester to receive the traditional BSMSPE, will not be readmitted into the combined program. If the student is interested in pursuing a graduate degree after dropping out of the BSMSPE/MSME program, the student will have to enroll in the traditional graduate program.
- 10. The graduate program will offer thesis and non-thesis (Professional Master's in Motorsports Engineering) BSMSPE/MSME options. Depending on the nature of the research, in some cases the thesis option may require an additional semester to complete. For the MSME thesis part of the BSMSPE/MSME program, the student will have an advisory committee that will consist of at least three members of the graduate faculty, including a major professor.
- 11. Following conditional admission to the BSMSPE/MSME program, the student's performance will be assessed by the ME Graduate Committee at the end of semester 8 while completing their bachelor's degree to ensure that (1) the student's performance is at the level expected for traditional MSME students in the ME graduate program and (2) the grades in each of the Master's courses taken in the BSMSPE plan of study are a B or higher.
- 12. Students will receive the MSME diploma, upon completion of the requisite credit hours and meeting of all GPA and grade requirements. If the student's performance is judged by the ME Graduate Committee to be unsatisfactory for the combined BSMSPE/MSME program, because of not meeting the minimum grade requirements (minimum 3.20 GPA for bachelor's studies and 3.00 GPA for master's studies, and minimum B grade in any of the first four graduate courses taken), the student will still be able to receive a BSMSPE upon completion of all the requirements for that degree (128 credits and the minimum GPA requirements set for the BSMSPE).
- 13. This degree program will be offered at the Indianapolis campus for the BSMSPE degree path whereas students can fulfill the MSME course requirements at either the West Lafayette or the Indianapolis location, inclusive.

Comparison to Current Programs:

- The program satisfies all the current requirements for an MSME.
- The program satisfies all the current requirements for an undergraduate BSMSPE degree.

Outcomes of the Program:

Students who complete the combined BSMSPE/MSME program will be well prepared to:

• work in advanced technical centers of industry as research and development specialists

- work in private and government research institutions
- design and develop advanced products requiring knowledge and experience in advanced engineering
- pursue a Ph.D. degree in Mechanical Engineering with completion of MSME-thesis.

Expected Enrollment:

The program should be attractive to MSPE students because there have been frequent inquiries on using the graduate courses taken in students' senior year towards their MSME degree. It is expected that the program will attract at least ten (and up to twenty) students per year. The first group of graduates will be after the third year following the start of the program. The GPA of 3.4 and higher corresponds to about 40% of the students in the current BSMSPE program, these being the students eligible to enroll in the program.

Assessment of Progress and Outcomes:

The ME Graduate Committee will assess progress of the students each semester during the last two years. The same committee will assess the program outcomes via:

- Student satisfaction surveys
- Exit surveys from graduating students
- Course outcomes surveys completed by students in each course
- Assessment rubrics being developed for juries in ME 698 Master's Thesis Research and ME 597 Mechanical Engineering Project I courses
- Employer surveys
- Alumni surveys
- Progress statistics
- Combined program enrollment numbers

Program improvements will be made, as needed, based on the results of these formal surveys, and informal feedback from the students.

Faculty and other Resources:

No new faculty positions or resources are needed for this program, because all undergraduate and graduate courses in Mechanical Engineering will be taught by existing faculty in the School. The additional work related to processing of applications into the combined BSMSPE/MSME program will be shared between the undergraduate and graduate offices within Mechanical Engineering as appropriate.

Table 1. Timeline and Milestones for the combined BSMSPE/MSME program.

- 1. The student files an application to be admitted into the BSMSPE/MSME program in their 6th semester of the undergraduate program, when the student has completed the first 81 credit hours in the BSMSPE plan of study with a GPA of 3.4 or higher.
- 2. After verifying the student's record, the Graduate Committee will conditionally accept the student to the combined BSMSPE/MSME degree program.
- 3. The student updates the BSMSPE plan of study no later than one semester before completion of the SP plan of study (normally in 7th semester same as the traditional program students), so that the plan of study includes the four graduate courses (12 credit hours) taken or to be taken in the BSMSPE plan of study.
- 4. The student will be accepted to the graduate program after finishing 128 credit hours of BSMSPE plan of study, including the four Master's courses (normally at end of the 8th semester), only if the student maintains a minimum 3.20 GPA and at least a B in each of the four graduate courses taken. If these conditions are not met, the student will be considered for a BSMSPE degree only.
- 5. Once admitted to the graduate program, the student files a graduate plan of study (in the 9th semester) that will include the 12 credit hours of graduate courses taken for BSMSPE degree that will be transferred with grades. Henceforth, the graduation requirements will be same as in the traditional Master's degree.

Semester-by-Semester Distribution of Courses in the Combined Five-Year BSMSPE/MSME Program (Thesis Option)

First Semester			
MA 16500	Diff Calculus	4	
EPCS 11100	EPICS I	2	
CHEM 11510	Chemical Lecture	3	
CHEM 11520	Chemistry Lab	1	
WC Elective	Written Communication Elective	3	
Gen Ed Elec	Gen Ed Elective I	3	
		Total 1	6
Second Semester			
MA 16600	Integ Calculus	4	
PHYS 17200	Modern Physics	4	
EPCS 12100	EPICS II	2	
OC Elective	Oral Communication Elective	3	
SCI Elec	Science Elective	3	
	Science Execute	Total 1	
Third Semester			
MA 26100	Multivariate Calculus	4	
ME 27000	Statics	3	
MSPE 29701	Motorsports Intro to Modeling	2	
MSPE 29000	Seminar Seminar	1	
MSPE 29800	Motorsports Programming	2	
Gen Ed Elec	Gen Ed Elective II	3	
		Total 1	
Fourth Semester	•		
MA 26200	Linear Alg & Differential Eq	4	
ECE 20001	Electrical Engineering Fundamentals I	3	
ECE 20007	Electrical Engineering Fundamentals Lab	1	
ME 20000	Thermodynamics I	3	
ME 26400	Intro to Manufacturing & Design	3	
ME 27400	Dynamics	3	
1112 27 100	Dynamics	Total 1	7
Fifth Semester			
ME 32300	Mechanics of Materials	3	
ME 32301	Mechanics of Materials Lab	1	
ME 36500	Measurement & Control Systems I	3	
MSPE 33000	System Engineering in Motorsports	3	
MSPE 35000	Computer Aided Design & Analysis	3	
MSPE 47200	Vehicle Dynamics	3	
WISI E 4/200	venicle Bynamics	Total 1	
Sixth Semester		1	
ME 30800	Fluid Mechanics	3	
MSPE 37500	Motorsports Control Systems	3	
MSPE 31700	Practicum I	1	
MSPE 32000	Motorsports Design I	3	
World Elec	World Cultural Elective	3	
	Econ Elective	3	
Econ Elec	ECOH EXCUSE	Total 1	
		Total 1	U

Seventh Semester

ME 30801	Fluid Mechanics Lab		1
MSPE 48200	Motorsports Aerodynamics		3
MSPE 42600	Motorsports Powertrain		3
MSPE 41700	Practicum II		1
ME 5XX55	ME Primary/Related Area Course		3
ME 5XX55	ME Primary/Related Area Course		3
Gen Ed Elec	Gen Ed Elective III		3
		Total	17

Eighth Semester

MSPE 41400	Motorsports Design II	3
MSPE 43100	Race Engineering	3
ME 5XX55	ME Primary/Related Area Course	3
ME 5XX55 or MA 5XX	ME Primary/Related Area Course	3
Gen Ed Elec	Gen Ed Elective IV	3
	Total	15

Ninth Semester

ME 5XX55 or MA 5XX	ME Primary Area Course	3
ME 5XX	ME Related Area Course (or approved)	3
ME 698 (thesis option)	Thesis Research	3
	Total	9

Tenth Semester

ME 698 (thesis option)	Thesis Research	3
ME 698 (thesis option)	Thesis Research	3
ME 5XX	ME Related Area Course (or approved)	3
	Total	9

Total: 146 credit hours

Semester-by-Semester Distribution of Courses in the Combined Five-Year BSMSPE/MSME Program (Non-Thesis Professional Program in Motorsports Engineering Option)

Professio	nai Program in Motorsports Engineering C	puon)
First Semester		
MA 16500	Diff Calculus	4
EPCS 11100	EPICS I	2
CHM 11510	Chemistry Lecture	3
CHM 11520	Chemistry Lab	1
WC Elective	Written Communication Elective	3
Gen Ed Elec	Gen Ed Elective I	3
		Total 16
Conord Compostor		
Second Semester MA 16600	Integral Calculus	4
PHYS 17200	Modern Physics	4
EPCS 12100	EPICS II	
OC Elective	Oral Communication Elective	2
		3
SCI Elec	Science Elective	3
		Total 16
Third Semester		
MA 26100	Multivariate Calculus	4
ME 2700	Statics	3
MSPE 29701	Motorsports Intro to Modeling	2
MSPE 29000	Seminar	1
MSPE 29800	Motorsports Programming	2
Gen Ed Elec	Gen Ed Elective II	3
		Total 15
Fourth Semester		
MA 26200	Linear Algebra & Differential Eq	4
ECE 20001	Electrical Engineering Fundamentals I	3
ECE 20007	Electrical Engineering Fundamentals Lab	1
ME 20000	Thermodynamics I	3
ME 26400	Intro to Manufacturing & Design	3
ME 27400	Dynamics Design	3
1/12/2/100	Dynamics	Total 17
Fifth Semester		,
ME 32300	Mechanics of Materials	3
ME 32301	Mechanics of Materials Lab	1
ME 36500	Measurement & Control Systems I	3
MSPE 33000	System Engineering in Motorsports	3
MSPE 35000	Computer Aided Design & Analysis	3
WISI E 33000	Computer Aided Design & Analysis	Total 16
	I	Total 10
Sixth Semester ME 30800	Fluid Mechanics	3
MSPE 37500	Motorsports Control Systems	1
MSPE 31700	Practicum I	3
MSPE 32000	Motorsports Design I	3
World Elec	World Cultural Elective	3
Econ Elec	Econ Elective	3
		Total 16

Seventh Semester

ME 30801	Fluid Mechanics Lab		1
MSPE 48200	Motorsports Aerodynamics		3
MSPE 42600	Motorsports Powertrain		3
MSPE 41700	Practicum II		1
ME 5XX55	ME Primary/Related Area Course		3
ME 5XX55	ME Primary/Related Area Course		3
Gen Ed Elec			3
		Total	17

Eighth Semester

MSPE 41400	Motorsports Design II	3
MSPE 43100	Race Engineering	3
ME 5XX55	ME Primary/Related Area Course	3
ME 5XX55 or MA 5XX	ME Primary/Related Area Course	3
Gen Ed Elec		3
	Total	15

Ninth Semester

ME 5XX	ME Primary/Related Area Course	3
ME 5XX	ME Primary/Related Area Course	3
ME 5XX	ME Primary/Related Area Course	3
	Total	9

Tenth Semester

ME 5XX	ME Primary/Related Area Course	3
ME 5XX	ME Primary/Related Area Course	3
ME 5XX or ME 597	ME Primary/Related Area Course or Project Course	3
	Total	9

Total: 146 credit hours

Notes:

- 1. Qualified students pursing the non-thesis Master's will be admitted to the Master's in Motorsports Engineering PMP program.
- 2. Depending on the thesis topic, the thesis options may take longer than five years.
- 3. For the thesis option, **two math courses are required** as the related area courses. At least one of these courses must be a graduate mathematics course offered by the mathematics department; the other may a graduate course with strong math content from the approved applied math course listing on the ME grad website.
- 4. It is to be noted that very few undergraduates take 500 level courses as ME electives currently in the program. They usually take 400 level courses. However, students in the proposed combined BSMSPE/MSME program will be required to take four 500 level courses as technical electives; they are expected to achieve more because of their commitment to the graduate program.