PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(50000-60000 LEVEL)

DEPARTMENT Engineering Technology
EFFECTIVE SESSION Fall 2012

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- New course with supporting documents (complete proposal form)
- Add existing course offered at another campus
- Expiration of a course
- Change in course number
- Change in course title
- Change in course credit/credit type
- Transfer from one department to another

PROPOSED:
Subject Abbreviation TECH
Course Number 59900
Long Title Motorsports Project Management
Short Title Motorsports Proj Mgmt.

EXISTING:
Subject Abbreviation
Course Number

TERMS OFFERED
Check All That Apply:
- Fall
- Spring
- Summer

CAMPUS(ES) INVOLVED
- Calumet
- Fort Wayne
- Indianapolis
- N. Central
- Tech Statewide
- W. Lafayette

Abbreviated title will be entered by the Office of the Registrar if omitted. (90 CHARACTERS ONLY)

<table>
<thead>
<tr>
<th>CREDIT TYPE</th>
<th>COURSE ATTRIBUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fixed Credit: Cr. Hrs.</td>
<td>6. Registration Approval Type</td>
</tr>
<tr>
<td>2. Variable Credit Range: Minimum Cr. Hrs. (Check One) To Maximum Cr. Hrs.</td>
<td></td>
</tr>
<tr>
<td>3. Equivalent Credit: Yes</td>
<td>7. Variable Title</td>
</tr>
<tr>
<td>4. Thesis Credit: Yes</td>
<td>8. Honors</td>
</tr>
</tbody>
</table>

Schedule Type
- Lecture
- Recitation
- Presentation
- Laboratory
- Lab Prep
- Studio
- Distance
- Clinic
- Experiential
- Research
- Ind. Study
- Prac/Observ

Minutes Per Mo. | Meetings Per Week | Weeks Offered | 10. Off Campus Experience
-----------------|-----------------|--------------|----------------------|

% of Credit Allocated

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
P: Permission of Instructor. This course focuses on organizational and engineering project management aspects specific to the operation of a race team or other closely related business in the extremely fast moving world of motorsports.

Calumet Department Head
Date

Calumet School Dean
Date

Calumet Undergrad Curriculum Committee
Date

Fort Wayne Department Head
Date

Fort Wayne School Dean
Date

Fort Waynes Chancellor
Date

Undergrad Curriculum Committee
Date

North Central Department Head
Date

North Central School Dean
Date

Date Approved by Graduate Council

West Lafayette Department Head
Date

West Lafayette College/School Dean
Date

Graduate Council Secretary
Date

Graduate Area Committee Convener
Date

Graduate Dean
Date

West Lafayette Registrar
Date

OFFICE OF THE REGISTRAR
Supporting Document for a New Graduate Course

To: Purdue University Graduate Council

From: Faculty Member: Pete Hylton
Department: ENT
Campus: IUPUI

Date: 5/3/11

Subject: Proposal for New Graduate Course-Documentation Required by the Graduate Council to Accompany Registrar's Form 40G

Contact for information if questions arise:

Name: Pete Hylton
Phone Number: 317-274-7192
E-mail: phyton@iupui.edu
Campus Address: ET201T

Course Subject Abbreviation and Number: TECH 50900
Course Title: Motorsports Project Management

A. Justification for the Course:

• Provide a complete and detailed explanation of the need for the course (e.g., in the preparation of students, in providing new knowledge/training in one or more topics, in meeting degree requirements, etc.), how the course contributes to existing majors and/or concentrations, and how the course relates to other graduate courses offered by the department, other departments, or interdisciplinary programs.

• Justify the level of the proposed graduate course (50000- or 60000-level) including statements on, but not limited to: (1) the target audience, including the anticipated number of undergraduate and graduate students who will enroll in the course; and (2) the rigor of the course.

B. Learning Outcomes and Method of Evaluation or Assessment:

• Describe the course objectives and student learning outcomes that address the objectives (i.e., knowledge, communication, critical thinking, ethical research, etc.).

• Describe the methods of evaluation or assessment of student learning outcomes. (Include evidence for both direct and indirect methods.)

• Grading criteria (select from dropdown box); include a statement describing the criteria that will be used to assess students and how the final grade will be determined.

| Criteria | Papers and Projects |
C. Prerequisite(s):

- List prerequisite courses by subject abbreviation, number, and title.
- List other prerequisites and/or experiences/background required. If no prerequisites are indicated, provide an explanation for their absence.

D. Course Instructor(s):

- Provide the name, rank, and department/program affiliation of the instructor(s).
- Is the instructor currently a member of the Graduate Faculty?  X  Yes  — No
  (If the answer is no, indicate when it is expected that a request will be submitted.)

E. Course Outline:

- Provide an outline of topics to be covered and indicate the relative amount of time or emphasis devoted to each topic. If laboratory or field experiences are used to supplement a lecture course, explain the value of the experience(s) to enhance the quality of the course and student learning. For special topics courses, include a sample outline of a course that would be offered under the proposed course.

F. Reading List (including course text):

- A primary reading list or bibliography should be limited to material the students will be required to read in order to successfully complete the course. It should not be a compilation of general reference material.
- A secondary reading list or bibliography should include material students may use as background information.

G. Library Resources

- Describe the library resources that are currently available or the resources needed to support this proposed course.

H. Example of a Course Syllabus  (While not a necessary component of this supporting document, an example of a course syllabus is available, for information, by clicking on the link below, which goes to the Graduate School's Policies and Procedures Manual for Administering Graduate Student Programs. See Appendix K.)


(Revised and Approved by the Graduate Council 10/10)
A. Justification for Course

This course supports the new MS-TECH Motorsports Area of Specialization. It further prepares BS engineers or engineering technologists associated with the motorsports industry to advance their career in that industry thru graduate level coursework by providing training relative to the management of technical projects within the industry. The motorsports industry is unique due not only to its unique technologies, but due to the extremely rapid changes, design cycles, and turn-around times for projects. In most industries new designs require years, and implementation of component or process changes require months. In motorsports complete designs occur in months and major changes may be required in times as short as a few days, making the management of technical projects completely different from other industries, thus necessitating this new course.

B. Learning Outcomes and Method of Evaluation or Assessment

Outcomes:

1. Students will demonstrate a recognition of the pace and process associated with motorsports project management and an ability to operate in that environment.
2. Students will create integrated budgets and schedules appropriate to management of motorsports projects.
3. Students will assess and analyze technical risk and synthesize engineering aspects of the
design in order to develop technical risk mitigation plans appropriate for motorsports
projects.
4. Students will communicate effectively, in both oral and written communications.
5. Students will demonstrate the ability to operate effectively and interact appropriately with
people in dynamic teams.

Evaluation Mechanisms:

Individual and team projects, evaluated using industry-type assessment approaches
Written and oral reports, evaluated using industry-type assessment approaches

Grading Criteria: Papers and Projects with a scale of
90-10=A, 80-90=B, 70-80=C, 60-70=D, Below 60=F

Method of Instruction: Lecture

C. Prerequisites

Permission of the Instructor

D. Course Instructor:

Pete Hylton
Associate Professor & Director of Motorsports Engineering
Indiana University Purdue University Indianapolis
799 W. Michigan St. - ET201T
Indianapolis, IN 46202
317-274-7192
phylton@iupui.edu
or another suitable member of the Motorsports Engineering faculty.

E. Course Outline

1. Project scheduling of motorsports projects, accounting for the unique pace of
teams and businesses operating in the motorsports industry
   a. Tools
   b. Philosophy
   c. Integrated Master Schedule (IMS)
d. Managing a project by managing its schedule

2. Cost estimating and budgets, including the integration of this aspect with the project schedule in order to oversee and monitor the project progress and react to unexpected changes in requirements.

3. Design process steps and activities as they relate to following a project from concept initiation through preliminary design, preliminary analysis, detailed design and implementation including obtaining necessary management approvals at required milestones.
   a. Concurrent vs. Serial
   b. Stages and steps

4. Analysis Techniques, both preliminary (using hand calculations and approximations based on sound engineering first principles) and detailed (using appropriate analysis tools and testing methodologies).
   a. Application of fundamentals
   b. Hand calculations and approximations
   c. Finite Element Modeling (FEM)
   d. Detailed analysis
      i. Stress
      ii. Thermal
      iii. Dynamic
      iv. Trade studies

5. Probabilistic analysis and its use to determine reliability, failure probabilities, mean time between failures, and required mean time between replacement or service.

6. Interface issues pertaining to the combination of multiple systems as well as the interaction of discrete design teams working on multiple projects that must integrate to provide a viable resultant system.

7. Technical proposals, including the creation and presentation of proposed technical design efforts to either internal management or external customers.

8. Ethics, involving legal and moral implications of technical decisions, as well as personnel and people management issues.

9. Technical Presentations
10. Technical Reports

F. Reading List


G. Library Resources

Motorsports Engineering department currently maintains a library of pertinent motorsports industry magazines and design resource texts.

H. Course Syllabus
Attached as separate document
Syllabus

Course Number: TECH 50900
Course Title: Motorsports Project Management
Credit Hours: 3
Class Times: tbd
Class Location: tbd
Instructor: Pete Hylton  
Phone: 317-274-7192  
email: phylton@iupui.edu  
Office: ET201T
Prerequisites: Permission of instructor.

Course Description:

This course focuses on engineering and organizational project management aspects specific to the technical operation of a race team or other closely related business in the extremely fast moving motorsports industry.

The motorsports industry is unique in that the cycle time for an entirely new design of a complete competition vehicle is months rather than years and the time frame for a major redesign of a significant system is weeks not months, and for a component or subsystem can be days rather than weeks. Additionally, the inevitability of unexpected events in motorsports means that project scheduling must be in a constant state of flux because any given weekend the result may be a successful winning car, a last place finish requiring major overhaul, or the complete destruction of the vehicle, requiring a complete change of redirection in efforts. The determination of which scenario exists can be as little as five days before the vehicle is required to be operational again.

This requires that engineers and technicians in the motorsports industry be constantly prepared for shifting schedules, unexpected time lines, and changing requirements, and while the budget is likely constrained, the requirements against that budget may change radically from initial plan to final implementation. While operating
in this unique environment, motorsports businesses must contend with the same ethical, financial, resource, leadership, personnel, and business management problems faced by other industries. For all these reasons, there is a need to examine the project management issues of motorsports from a different perspective than that used for traditional industries.

Educational Objectives/Course Outcomes:

1. Students will demonstrate a recognition of the pace and process associated with motorsports project management and an ability to operate in that environment.
2. Students will create integrated budgets and schedules appropriate to management of motorsports projects.
3. Students will assess and analyze technical risk and synthesize engineering aspects of the design in order to develop technical risk mitigation plans appropriate for motorsports projects.
4. Students will communicate effectively, in both oral and written communications.
5. Students will demonstrate the ability to operate effectively and interact appropriately with people in dynamic teams.

Course Content/Topics:

1. Project scheduling of motorsports projects, accounting for the unique pace of teams and businesses operating in the motorsports industry
   a. Tools
   b. Philosophy
   c. Integrated Master Schedule (IMS)
   d. Managing a project by managing its schedule
2. Cost estimating and budgets, including the integration of this aspect with the project schedule in order to oversee and monitor the project progress and react to unexpected changes in requirements
3. Design process steps and activities as they relate to following a project from concept initiation through preliminary design, preliminary analysis, detailed analysis, detailed design and implementation including obtaining necessary management approvals at required milestones.
   a. Concurrent vs. Serial
   b. Stages and steps
4. Analysis Techniques, both preliminary (using hand calculations and approximations based on sound engineering first principles) and detailed (using appropriate analysis tools and testing methodologies).
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5. Probabilistic analysis and its use to determine reliability, failure probabilities, mean time between failures, and required mean time between replacement or service.
6. Interface issues pertaining to the combination of multiple systems as well as the interaction of discrete design teams working on multiple projects that must integrate to provide a viable resultant system.
7. Technical proposals, including the creation and presentation of proposed technical design efforts to either internal management or external customers.
8. Ethics, involving legal and moral implications of technical decisions, as well as personnel and people management issues.
9. Technical Presentations
10. Technical Reports


Evaluation:

Individual Assignments/Projects
(These will consist of technical problems to be solved on an individual basis using skill sets covered in the course lectures OR individual essays written to expand upon topics covered in the course, research topics in more detail, or synthesize multiple aspects of the course. Assignments will vary from semester to semester. Assessment for each individual will be performed on the basis of the rubrics shown below) 200 points

Team Project
(This project will require a team-based examination of a particular technical problem related to the motorsports industry and proposed solutions to that problem. Assessment for each individual on a team will be performed on the basis of the rubrics shown below.) 200 points

Total 400 points
### Individual Project Evaluation Rubric

<table>
<thead>
<tr>
<th>EXCELLENT</th>
<th>HIGH</th>
<th>MODERATE</th>
<th>LOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate knowledge of all technical items and the ability to apply them</td>
<td>Demonstrate knowledge of at least the critical, safety related technical items and the ability to apply them</td>
<td>Demonstrate knowledge of 50% of all technical items and the ability to apply them</td>
<td>Demonstrate knowledge of less than 50% of all technical items and the ability to apply them</td>
</tr>
<tr>
<td>EXCELLENT</td>
<td>HIGH</td>
<td>MODERATE</td>
<td>LOW</td>
</tr>
<tr>
<td>Effective communication at all times.</td>
<td>Effective communication at least 75% of the time.</td>
<td>Effective communication at least 50% of the time.</td>
<td>Effective communication less than 50% of the time.</td>
</tr>
</tbody>
</table>

### Team Project Evaluation Rubric

<table>
<thead>
<tr>
<th>EXCELLENT</th>
<th>HIGH</th>
<th>MODERATE</th>
<th>LOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate knowledge of all technical items and the ability to apply them</td>
<td>Demonstrate knowledge of at least the critical, safety related technical items and the ability to apply them</td>
<td>Demonstrate knowledge of 50% of all technical items and the ability to apply them</td>
<td>Demonstrate knowledge of less than 50% of all technical items and the ability to apply them</td>
</tr>
<tr>
<td>EXCELLENT</td>
<td>HIGH</td>
<td>MODERATE</td>
<td>LOW</td>
</tr>
<tr>
<td>Create multiple communications in support of technical analysis</td>
<td>Create at least one in support of technical analysis</td>
<td>Assist in creation of multiple communication in support of technical analysis</td>
<td>Inconsistent assistance in creation of communication in support of technical analysis</td>
</tr>
<tr>
<td>EXCELLENT</td>
<td>HIGH</td>
<td>MODERATE</td>
<td>LOW</td>
</tr>
<tr>
<td>Assume leadership role in multiple team activities and assume multiple responsibilities within the team.</td>
<td>Assume leadership role in some team activity and assume multiple responsibilities within the team.</td>
<td>Participate in some team activities and take on at least one responsibility within the team.</td>
<td>Does not add to team activities.</td>
</tr>
<tr>
<td>EXCELLENT</td>
<td>HIGH</td>
<td>MODERATE</td>
<td>LOW</td>
</tr>
<tr>
<td>Effective inter-team communication at all times.</td>
<td>Effective inter-team communication at least 75% of the time.</td>
<td>Effective inter-team communication at least 50% of the time.</td>
<td>Effective inter-team communication less than 50% of the time.</td>
</tr>
<tr>
<td>EXCELLENT</td>
<td>HIGH</td>
<td>MODERATE</td>
<td>LOW</td>
</tr>
<tr>
<td>Demonstrate consideration of ethics and societal impact.</td>
<td>Demonstrate consideration of ethics and societal impact in at least 75% of interactions.</td>
<td>Demonstrate consideration of ethics and societal impact in at least 50% of interactions.</td>
<td>Demonstrate consideration of ethics and societal impact in less than 50% of interactions.</td>
</tr>
</tbody>
</table>

### Grading Scale:

90-100 = A, 80-90 = B, 70-80 = C, 0-70 = F

+/- may be given at professor’s discretion

### Cheating:

Cheating is considered to be an attempt to use or provide unauthorized assistance, materials, information, or study aids in any form and in any academic exercise or environment.

a. A student must not use external assistance on any “in-class” or “take-home” examination, unless the instructor specifically has authorized external
assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, calculators, computers, and wireless communication devices.

b. A student must not use another person as a substitute in the taking of an examination or quiz, nor allow other persons to conduct research or to prepare work, without advance authorization from the instructor to whom the work is being submitted.

c. A student must not use materials from a commercial term paper company; files of papers prepared by other persons, or submit documents found on the Internet. A student must not collaborate with other persons on a particular project and submit a copy of a written report that is represented explicitly or implicitly as the student’s individual work.

d. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on fieldwork.

e. A student must not steal examinations or other course materials, including but not limited to, physical copies and photographic or electronic images.

f. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor or program to whom he work is being submitted.

g. A student must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.

Fabrication:

A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citation to the sources of information.

Plagiarism:

Plagiarism is defined as presenting someone else’s work, including the work of other students, as one’s own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged, unless the information is common knowledge. What is considered “common knowledge” may differ from course to course.

a. A student must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgment.

b. A student must give credit to the originality of others and acknowledge indebtedness whenever:
   1. Directly quoting another person’s actual words, whether oral or written;
   2. Using another person’s ideas, opinions, or theories;
   3. Paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
   4. Borrowing facts, statistics, or illustrative material; or
5. Offering materials assembled or collected by others in the form of projects or collections without acknowledgment.

Facilitating Academic Dishonesty:

Facilitating academic dishonesty is when a student aids or attempts to aid another student in committing academic misconduct. Examples of such activities might be:
- Allowing another student to copy answers on examinations.
- Writing a paper for another student.

Interference:

Interference is when a student prevents another student's work from being completed or evaluated properly. Examples might include:
- Stealing or changing another student's work before it is evaluated.
- Destroying another student's work.
- Stealing or defacing shared necessary resources to deprive others of their use.
- Offering bribes or favors to affect a grade or an evaluation of academic work.
- Making threats to affect a grade or an evaluation of academic work.

Violation of Course Rules:

Violation of course rules is when a student fails to abide by the rules stated in the course syllabus when those rules are related to course content or to enhancement of the learning process in the course. Examples of common violations include:
- Working with a group when a project is intended to be for each individual.
- Using unauthorized materials for examinations or projects.

Faculty Action on Misconduct:

All faculty are required to report academic misconduct to the university and to examine any accusations of academic misconduct from students.

IUPUI Nondiscrimination Policy for People with Disabilities:

Indiana University-Purdue University Indianapolis is committed to the spirit and letter of the Americans with Disabilities Act. Hereofore, the University has been subject to the nondiscrimination provisions of Sections 503 and 504 of the Rehabilitation Act of 1973. Under Sections 503 and 504, the University has instituted various administrative policies, practices and procedures to ensure nondiscrimination against individuals with disabilities. These policies, practices and procedures have been amended to comply with the requirements of the Americans with Disabilities Act.

Accordingly, "no qualified individual with a disability shall, by reason of such disability, be either excluded from participation in or be denied the benefits of the services, programs, or activities" of Indiana University-Purdue University Indianapolis.
Moreover, no qualified individual with a disability shall be discriminated against because of the disability of that individual with regard to job application procedures, the hiring or discharge of employees, compensation, advancement, job training, and other terms, conditions and privileges of employment.

**General Classroom Policy:**

1. Keep cell phones/pagers on silent mode.
2. If you need to leave the classroom to return a call, or page, or to use the restroom – do so quietly so as not to disturb your classmates.
3. No cell phones, pagers, or PDA’s will be allowed during tests.
4. Anyone caught cheating on a test will receive a zero.
5. Copying from each other on independent projects or lab reports will result in a severe penalty to both parties.
6. Late assignments (unless due confirmed circumstances based on circumstances consistent as qualifying as a confirmed absence) will only be accepted with a significant penalty for lateness.
7. Absences – it is your responsibility to be in class and that is where you are expected to be. Acceptable absences for which the instructor will work with you include your illness (with immediate phone or email notification to the instructor and verification afterwards) severe illness of immediate family member (ditto) or mandatory work assignments (with maximum advance notice and verification).
8. On course will be used to inform students of intermediate grades, team grades, schedule changes, etc. when necessary.
# New Course IN TECH 50900

## Course Request Key Fields

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Requesting Campus: IN-IUPUI</td>
</tr>
<tr>
<td>2.</td>
<td>Matching Course: No</td>
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<tr>
<td>3.</td>
<td>School: TECH-Purdue School of Technology</td>
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<tr>
<td>4.</td>
<td>Subject: TECH-Technology</td>
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<tr>
<td>5 a.</td>
<td>Course Number: 50900</td>
</tr>
<tr>
<td>b.</td>
<td>Has course number been reserved with, <a href="mailto:usssorct@indiana.edu">usssorct@indiana.edu</a>, University Student Services and Systems? Yes</td>
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<tr>
<td>6.</td>
<td>Credit Type: Graduate</td>
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<td>7.</td>
<td>Is this a Purdue Course? Yes</td>
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<td>8 a.</td>
<td>Course Title</td>
</tr>
<tr>
<td>b.</td>
<td>Recommended Abbreviation (30 characters including spaces): Motorsports Proj Mgmt</td>
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</table>

## Course Catalog Attributes

<p>| | |</p>
<table>
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<tbody>
<tr>
<td>9.</td>
<td>Academic Career: Graduate</td>
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<tr>
<td>10.</td>
<td>Effective Term (anticipated): Fall 2012</td>
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<tr>
<td>11.</td>
<td>Credit Hours: Fixed at 3</td>
</tr>
<tr>
<td>12.</td>
<td>Contact Hours: Fixed at 3</td>
</tr>
<tr>
<td>13.</td>
<td>Is S-F grading approval being requested? No</td>
</tr>
<tr>
<td>14.</td>
<td>Is variable title approval being requested? No</td>
</tr>
<tr>
<td>15.</td>
<td>Prerequisites/Corequisites (Information Only): P: Permission of instructor.</td>
</tr>
<tr>
<td>16.</td>
<td>Course Description: This course focuses on organizational and engineering project management aspects specific to the operation of a race team or other closely related business in the extremely fast moving world of motorsports.</td>
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## Course Attributes for Scheduling

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<tbody>
<tr>
<td>17.</td>
<td>Equivalent Courses: none</td>
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<tr>
<td>18 a.</td>
<td>Repeatable for Credit? No</td>
</tr>
<tr>
<td>b.</td>
<td>Total Career Credit Hours Allowed:</td>
</tr>
<tr>
<td>c.</td>
<td>Total Career Completions Allowed:</td>
</tr>
<tr>
<td>d.</td>
<td>Allow multiple enrollments in term?</td>
</tr>
<tr>
<td>19 a.</td>
<td>Type of Instructional Experience (Select primary component): Lecture</td>
</tr>
<tr>
<td>b.</td>
<td>Additional component(s) that apply: Discussion, Readings</td>
</tr>
<tr>
<td>20.</td>
<td>Instruction Mode (select all that apply): Face-To-Face</td>
</tr>
<tr>
<td>21.</td>
<td>Instructor Name: Prof. Pete Hylton</td>
</tr>
<tr>
<td>22.</td>
<td>Estimated Enrollment: 15</td>
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### Additional Course Information

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. Estimated Enrollment Percent Expected to be Graduate Students:</td>
<td>90</td>
</tr>
<tr>
<td>24. Frequency of Schedule:</td>
<td>Once Per Year</td>
</tr>
<tr>
<td>25. Course Typically Offered:</td>
<td>Spring Term</td>
</tr>
<tr>
<td>26. Will this course be required for majors?</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Justification for New Course:
This course supports the new MS-TECH Motorsports Area of Specialization. It further prepares BS engineers or engineering technologists associated with the motorsports industry to advance their career in that industry.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 a. Does this course overlap with existing courses?</td>
<td>No</td>
</tr>
<tr>
<td>28 b. Please explain:</td>
<td></td>
</tr>
<tr>
<td>28 c. Have you contacted the appropriate department, school, etc. affected by the overlap?</td>
<td></td>
</tr>
<tr>
<td>29. Are the necessary reading materials currently available in the appropriate library?</td>
<td>Yes</td>
</tr>
<tr>
<td>30. Do you anticipate this course will require a special fee? (Information Only)</td>
<td>No</td>
</tr>
</tbody>
</table>

### Essential Syllabus Information
1. Project scheduling of motorsports projects, accounting for the unique pace of teams and businesses operating in the motorsports industry
   a. Tools
   b. Philosophy
   c. Integrated Master Schedule (IMS)
   d. Managing a project by managing its schedule
2. Cost estimating and budgets, including the integration of this aspect with the project schedule in order to oversee and monitor the project progress and react to unexpected changes in requirements
3. Design process steps and activities as they relate to following a project from concept initiation through preliminary design, preliminary analysis, detailed analysis, detailed design and implementation including obtaining necessary management approvals at required milestones.
   a. Concurrent vs. Serial
   b. Stages and steps
4. Analysis Techniques, both preliminary (using hand calculations and approximations based on sound engineering first principles) and detailed (using appropriate analysis tools and testing methodologies).
   a. Application of fundamentals
   b. Hand calculations and approximations
   c. Finite Element Modeling (FEM)
   d. Detailed analysis
      i. Stress
      ii. Thermal
      iii. Dynamic
      iv. Trade studies
5. Probabilistic analysis and its use to determine reliability, failure probabilities, mean time between failures, and required mean time between replacement or service.
6. Interface issues pertaining to the combination of multiple systems as well as the interaction of discrete design teams working on multiple projects that must integrate to provide a viable resultant system
7. Technical proposals, including the creation and presentation of proposed technical design efforts to either internal management or external customers.
8. Ethics, involving legal and moral implications of technical decisions, as well as personnel and people management issues.
9. Technical Presentations
10. Technical Reports


This course focuses on engineering and organizational project management aspects specific to the technical operation of a race team or other closely related business in the extremely fast moving motorsports industry. The motorsports industry is unique in that the cycle time for an entirely new design of a complete competition vehicle is months rather than years and the time frame for a major redesign of a significant system is weeks not months, and for a component or subsystem can be days rather than weeks. Additionally, the inevitability of unexpected events in motorsports means that project scheduling must be in a constant state of flux because any given weekend the result may be a successful winning car, a last place finish requiring major overhaul, or the complete destruction of the vehicle, requiring a complete change of redirection in efforts. The determination of which scenario exists can be as little as five days before the vehicle is required to be operational again. This requires that engineers and technicians in the motorsports industry be constantly prepared for shifting schedules, unexpected time lines, and changing requirements, and while the budget is likely constrained, the requirements against that budget may change radically from initial plan to final implementation. While operating in this unique environment, motorsports businesses must contend with the same ethical, financial, resource, leadership, personnel, and business management problems faced by other industries. For all these reasons, there is a need to examine the project management issues of motorsports from a different perspective than that used for traditional industries.

1. Students will demonstrate a recognition of the pace and process associated with motorsports project management and an ability to operate in that environment.
2. Students will create integrated budgets and schedules appropriate to management of motorsports projects.
3. Students will assess and analyze technical risk and synthesize engineering aspects of the design in order to develop technical risk mitigation plans appropriate for motorsports projects.
4. Students will communicate effectively, in both oral and written communications.
5. Students will demonstrate the ability to operate effectively and interact appropriately with people in dynamic teams.

Individual Assignments/Projects (These will consist of technical problems to be solved on an individual basis using skill sets covered in the course lectures OR individual essays written to expand upon topics covered in the course, research topics in more detail, or synthesize multiple aspects of the course. Assignments will vary from semester to semester. Assessment for each individual will be performed on the basis of the rubrics shown in syllabus) - 50%

Team Project (This project will require a team-based examination of a particular technical problem related to the motorsports industry and proposed solutions to that problem. Assessment for each individual on a team will be performed on the basis of the rubrics shown in syllabus.) - 50%

IN1 a. PUL - Major emphasis (Mandatory) (Information Only):

b. PUL - Moderate emphasis (Optional) (Information Only):

c. PUL - Some emphasis (Optional) (Information Only):
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Student Enrollment Services

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