A. **TITLE:** FRAME AND SUSPENSION SYSTEMS
B. **COURSE NUMBER:** MSPT 120  
**SHORT TITLE:** SUSPENSIONS

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE (OPTIONAL):** N/A

E. **COURSE LENGTH:** 15 WEEKS

F. **SEMESTER(S) OFFERED:** SPRING

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**  
   2 - 50 minute lecture hours per week  
   3 - Working lab

H. **CATALOGUE DESCRIPTION:** This course covers the theory, diagnostic and service procedures used in suspension and frame systems unique to the motorsports arena. Braking and suspension concerns are integrated into frame design theory.

I. **PRE-REQUISITES/CO-COURSES:** Motorsport Service, MSPT 101

J. **GOALS (STUDENT LEARNING OUTCOMES):**  
   By the end of this course, the student will be able to:

   1. Should have 6-7 objectives using the required texts set forth herein.  
   2. If this course outline is also being submitted for GER approval the learning outcomes from the requested GER must also be included in this list  
   3. Each measurable course objective must be mapped to the corresponding Institutional SLO and listed in the form of the table below.

<table>
<thead>
<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>a. Perform precision measurements key to frame and suspension set-up</td>
<td>1. Crit. Thinking</td>
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<td>2. Prof. Competence</td>
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<tr>
<td>b. Identify various frame and suspension design configurations common to motorsports</td>
<td>1. Crit. Thinking</td>
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<td>2. Prof. Competence</td>
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<tr>
<td>c. Diagnose and repair frame and suspension system problems</td>
<td>1. Communication</td>
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<td>2. Prof. Competence</td>
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<tr>
<td>d. Calculate steering geometry and rake and trail concerns affecting vehicle handling</td>
<td>1. Crit. Thinking</td>
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<td>2. Prof. Competence</td>
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<tr>
<td>e. Identify braking systems unique to light-weight motorsports vehicles</td>
<td>1. Crit. Thinking</td>
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<td></td>
<td>2. Prof. Competence</td>
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<tr>
<td>f. Perform gas shock rebuilding specific to rider weight and riding style</td>
<td>1. Crit. Thinking</td>
</tr>
<tr>
<td></td>
<td>2. Prof. Competence</td>
</tr>
</tbody>
</table>

K. **TEXTS:** Motorcycles, Fundamentals, Service, Repair  
   Johns, Edmundson, Scharff

L. **REFERENCES:** CD Rom data, Shop manuals of manufacturers, Mitchell manuals, All data, various online references

M. **EQUIPMENT:** Standard motorsports laboratory equipment, i.e., land and sea dynamometer/microsoft software
N. **GRADING METHOD:** (P/F, A-F, etc.) A-F

O. **MEASUREMENT CRITERIA/METHODS:** Quizzes, hourly exams, homework, laboratory performance tests, class participation

P. **DETAILED TOPICAL OUTLINE:**

MSPT 120 - FRAME AND SUSPENSION SYSTEMS

I. Introduction
   1. Class procedures and policies
   2. Opening discussion

II. Frame construction
   1. Cradle frame
   2. Backbone frame
   3. Diamond frame
   4. Delta box frame
   5. Pentagonal frame
   6. Stamped steel frames

III. Frame inspection
   1. New York State DOT compliance
   2. Federal Motor Vehicle Safety Standards

IV. Front suspension systems
   1. Telescopic front forks
   2. Pivoting link forks
   3. Leading link forks
   4. Single sided front swing arm designs
   5. Servicing front suspension systems

VII. Front steering geometry
    1. Rake
    2. Trail
    3. Steering dampeners

VIII. Rear suspension systems
    1. Shock absorbers
    2. Swing arm
    3. Single sided swing arm
    4. Linkless swing arm design
    5. Linked swing arms (mono-shock)

IX. Frame and suspension inspection
   1. Front suspension inspection summary
   2. Mid-frame inspection summary
   3. Rear suspension inspection
4. ATV four-wheel alignment

X Snowmobile suspension designs
   1. Bogie suspension systems
   2. Slide suspension systems
   3. Track alignment concerns
   4. Track cleat replacement
   5. Track replacement

XI Brake systems
   1. Brake design
   2. Brake inspection, maintenance and repair
   3. Unified brake controls
   4. Linked braking systems (LBS)
   5. Anti-lock braking systems (ABS)
   6. Trouble shooting motorcycle and snowmobile brake system concerns

Q. LABORATORY OUTLINE:

MSPT 120 - ENGINE AND POWER TRANSMISSION SERVICE

I. Introduction
   1. Laboratory procedures and policies
   2. Basic laboratory introduction

II. Introduction to Frame Construction
    1. Styles and designs
    2. Role of Technicians
    3. Minor maintenance

III. Frame Inspection
     1. New York State DOT compliance
     2. Federal Motor Vehicle Safety Standards

IV. Front Suspension Systems
    1. Types
    2. Conventional fork
    3. Single-sided front fork

V. Steering Geometry
   1. Rake/trail
   2. Dampeners

VI. Rear Suspensions
    1. Types
    2. Maintenance
    3. Theory
VII. Snowmobile Suspension Systems
   1. Track replacement
   2. Cleat replacement
   3. Alignment procedures