MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
MSPT 110 - Engine and Power Transmission Service

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Updated by: Christopher Mayville

Canino School of Engineering Technology
Department: Mechanical & Energy Technologies
Semester/Year: Fall 2018
A. **TITLE:** Engine and Power Transmission Service

B. **COURSE NUMBER:** MSPT 110

C. **CREDIT HOURS:** 4 credit hour(s) per week for 15 weeks

- One hour (50 minutes) of lecture per week Twice
- Two to three hours of lab or clinical per week This is a four hour two credit lab.
- Two hours of recitation per week
- 40 hours of internship

D. **WRITING INTENSIVE COURSE:** Yes ☑ No ☒

E. **GER CATEGORY:** None: ☒ Yes: GER
   
   If course satisfies more than one: GER

F. **SEMESTER(S) OFFERED:** Fall ☐ Spring ☑ Fall & Spring ☐

G. **COURSE DESCRIPTION:**

This course involves the complete disassembly, inspection, repair and reassembly of modern modular constructed powertrain assemblies. The principles of operations key to high performance, compact engines/transmission assemblies are thoroughly covered.

H. **PRE-REQUISITES:** None ☐ Yes ☑ If yes, list below:

MSPT 101-Powersports Service, or with permission of instructor

**CO-REQUISITES:** None ☒ Yes ☐ If yes, list below:
I. **STUDENT LEARNING OUTCOMES:** (see key below)

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
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</thead>
<tbody>
<tr>
<td>a. Perform precision measurements key to engine overhaul</td>
<td>MSPT S02 MSPT S04</td>
<td>ISLO ISLO ISLO</td>
<td>Subsets Subsets Subsets</td>
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<tr>
<td>b. Identify various engine design configurations</td>
<td>MSPT S02</td>
<td>ISLO ISLO ISLO</td>
<td>Subsets Subsets Subsets</td>
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<td>c. Diagnose and repair modular constructed powertrain assembly problems</td>
<td>MSPT S02</td>
<td>ISLO ISLO ISLO</td>
<td>Subsets Subsets Subsets</td>
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<td>d. Calculate gear ratios related to modular powertrain assemblies</td>
<td>MSPT S04</td>
<td>ISLO ISLO ISLO</td>
<td>Subsets Subsets Subsets</td>
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<td>f. Practice fundamentals associated with engine blueprinting</td>
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<td>ISLO ISLO ISLO</td>
<td>Subsets Subsets Subsets</td>
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<tr>
<td>KEY</td>
<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<tr>
<td>ISLO #</td>
<td>ISLO &amp; Subsets</td>
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</tbody>
</table>
| 1 | Communication Skills  
Oral [O], Written [W] |
| 2 | Critical Thinking  
Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS] |
| 3 | Foundational Skills  
Information Management [IM], Quantitative Lit./Reasoning [QTR] |
| 4 | Social Responsibility  
Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T] |
| 5 | Industry, Professional, Discipline Specific Knowledge and Skills |

*Include program objectives if applicable. Please consult with Program Coordinator.*
J. **APPLIED LEARNING COMPONENT:** Yes ☒ No ☐

If YES, select one or more of the following categories:

- [x] Classroom/Lab
- [ ] Internship
- [ ] Clinical Placement
- [ ] Practicum
- [ ] Service Learning
- [ ] Community Service
- [ ] Civic Engagement
- [ ] Creative Works/Senior Project
- [ ] Research
- [ ] Entrepreneurship (program, class, project)

K. **TEXTS:**

Modern Motorcycle Technology, Third Edition by Edward Abdo, Cengage Learning


L. **REFERENCES:**

Manufacturer specific service manuals

M. **EQUIPMENT:** None ☐ Needed: Standard powersports laboratory equipment

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Quizzes, exams, homework, laboratory reports, and laboratory participation

P. **DETAILED COURSE OUTLINE:**

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

II. **Engines**
   1. Four stroke engines
   2. Cam shaft arrangement

III. **Valve train assemblies**
   1. Pneumatic opening
   2. Desmodromic
   3. Coil springs

IV. **Engine case design**
   1. Unit construction
   2. Non-unit construction
   3. Vertical/horizontal split crank cases
4. One-piece case (trap door case)

V. Pistons, crankshafts and cylinders
1. Single cylinder engines
2. Multi-cylinder engines
3. Cylinder design and construction
4. Cylinder head design
5. Piston construction
6. Piston ring grooves
7. Four cycle engine bearings

VI. Two stroke engine designs
1. Intake timing
2. Piston port
3. Reed valve
4. Rotary valve
5. Piston port/crank case reed

VII. Transfer and exhaust timing
1. Exhaust system design
2. Scavenging process

VIII. Crank case sealing
1. Timing side
2. Wet side
3. Pressure test
4. Vacuum test

IX. Crank shaft configurations
1. Single cylinder crankshafts
2. Twin cylinder crankshafts
3. Multi cylinder crankshafts

X. Power transmissions
1. Gear action
2. Primary drives
3. Clutching
4. Transmission/final drives
5. Internal gear changing mechanisms
6. Final drive systems
7. Calculating ratios

Q. LABORATORY OUTLINE: None ☐ Yes ☒
C. Comparison to spec.
D. Reassembly

III. Valve Train Assembly Maintenance

IV. Two Stroke Engines
A. Disassembly and inspection
B. Measurement
C. Comparison to spec.
D. Reassembly

V. Cylinder Reconditioning
A. Cylinder boring
B. Honing

VI. Crankshaft Rebuilding
A. Single cylinders/multi-cylinders