Faculty members are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

**DEPT. AUTO COURSE NUMBER: 2113**

**NUMBER OF CREDITS:** 3 **Lecture:** 1 **Lab:** 2

<table>
<thead>
<tr>
<th>Course Title:</th>
<th>Manual Drivetrain and Axels</th>
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<tr>
<th>Catalog Description:</th>
<th>This course provides the fundamentals of conventional and light truck manual transmission and clutches. Contents will include power flow, design, adjustment, overhaul procedures, diagnosis, and repairs.</th>
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</table>

**FULFILLS MN TRANSFER CURRICULUM AREA(S)**

Goal 1: Communication: ____ by meeting the following competencies:

Goal 2: Critical Thinking: ____ by meeting the following competencies:

Goal 3: Natural Sciences: ____ by meeting the following competencies:

Goal 4: Mathematics/Logical Reasoning: ____ by meeting the following competencies:

Goal 5: History and the Social and Behavioral Sciences: ____ by meeting the following competencies:

Goal 6: The Humanities and Fine Arts: ____ by meeting the following competencies:

Goal 7: Human Diversity: ____ by meeting the following competencies:

Goal 8: Global Perspective: ____ by meeting the following competencies:

Goal 9: Ethical and Civic Responsibility: ____ by meeting the following competencies:

Goal 10: People and the Environment: ____ by meeting the following competencies:

<table>
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<tr>
<th>Prerequisites or Necessary Entry Skills/Knowledge:</th>
<th>None</th>
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</table>
### Topics to be Covered

<table>
<thead>
<tr>
<th>Manual transmission and clutch fundamentals</th>
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<tbody>
<tr>
<td>Manual transmission systems</td>
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<tr>
<td>Clutch systems</td>
</tr>
<tr>
<td>Testing and repair of manual transmission and clutch systems</td>
</tr>
</tbody>
</table>

### Student Learning Outcomes

1. Identify and interpret drive train concerns; determine needed action
2. Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; determine needed action.
3. Inspect flywheel and ring gear for wear and cracks; determine needed action.
4. Inspect and/or replace clutch pressure plate assembly, clutch disc, release bearing, linkage, and pilot bearing/bushing.
5. Inspect, adjust, lubricate, and/or replace shift linkages, brackets, bushings, cables, pivots, and levers.
6. Diagnose and repair drive shaft and half shaft, universal and constant-velocity (CV) joint. (Front, Rear, All-wheel, Four-wheel drive)
7. Diagnosis and Repair drive axels
8. Diagnose and repair four-wheel drive/all-wheel drive components
9. Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations

*The required outcomes follow the Auto Service Technician (AST) model of the National Automotive Technical Education Foundation (NATEF) certification program.*

### Is this course part of a transfer pathway?

- Yes ☐
- No ☒

Revised Date: 4/2020