



COURSE OUTLINE: AMF203 - ADDITIVE MANUFACT II

Prepared: Donovan Kennedy

Approved: Corey Meunier, Chair, Technology and Skilled Trades

| | |
|--|---|
| Course Code: Title | AMF203: ADDITIVE MANUFACTURING II |
| Program Number: Name | 4069: AUTOMATED MANUFACT. |
| Department: | ROBOTICS GRADUATE CERTIFICATE |
| Semesters/Terms: | 21W |
| Course Description: | In this course, students will manufacture parts from 3 dimensional computer models created in Autodesk Inventor or SolidWorks and other solid modeling applications. The students will develop the manufacturing plan and create the code required to program a 3D printer. Students will focus on the various applications, the size and design constraints, and develop a good understanding of the advantages and disadvantages of this technology. |
| Total Credits: | 3 |
| Hours/Week: | 3 |
| Total Hours: | 45 |
| Prerequisites: | AMF103 |
| Corequisites: | There are no co-requisites for this course. |
| Vocational Learning Outcomes (VLO's) addressed in this course: Please refer to program web page for a complete listing of program outcomes where applicable. | 4069 - AUTOMATED MANUFACT. VLO 1 Solve automated manufacturing problems found in a typical industrial environment by applying engineering principles and decision-making strategies. VLO 2 Analyze and synthesize technical data to develop graphics and related technical documents conforming to engineering standards. VLO 3 Select and manage appropriate hardware and software for the creation of engineering designs. VLO 4 Identify and utilize manufacturing processes, rapid prototyping methods, and automation technologies to optimize product development. VLO 7 Exercise professionalism, leadership, and effective communication in an industrial work setting to increase overall productivity and support a positive work environment. VLO 8 Ensure automation equipment is in compliance with established operating procedures, and occupational health and safety regulations. |
| Essential Employability Skills (EES) addressed in this course: | EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. |

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



SAULT COLLEGE | 443 NORTHERN AVENUE | SAULT STE. MARIE, ON P6B 4J3, CANADA | 705-759-2554

| | <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p> | | | | | | | | | | |
|---|--|------------------|--|---|--|------------------|--|---|--|------------------|--|
| Course Evaluation: | <p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p> | | | | | | | | | | |
| Other Course Evaluation & Assessment Requirements: | <p>Grade</p> <p>Definition Grade Point Equivalent</p> <p>A+ 90 - 100% 4.00</p> <p>A 80 - 89%</p> <p>B 70 - 79% 3.00</p> <p>C 60 - 69% 2.00</p> <p>D 50 - 59% 1.00</p> <p>F (Fail)49% and below 0.00</p> <p>CR (Credit) Credit for diploma requirements has been awarded.</p> <p>S Satisfactory achievement in field /clinical placement or non-graded subject area.</p> <p>U Unsatisfactory achievement in field/clinical placement or non-graded subject area.</p> <p>X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.</p> <p>NR Grade not reported to Registrar's office.</p> <p>W Student has withdrawn from the course without academic penalty.</p> <p>Smart watches, smart phones and similar devices are not allowed during tests or quizzes and must be removed. Smart phones are not acceptable for use as a calculator during a test or quiz.</p> | | | | | | | | | | |
| Books and Required Resources: | <p>Manufacturing Engineering Handbook by Hwaiyu Geng</p> <p>Publisher: McGraw-Hill Education Edition: Second</p> <p>ISBN: 978-0-07-183977-8</p> | | | | | | | | | | |
| Course Outcomes and Learning Objectives: | <table border="1"> <tr> <th>Course Outcome 1</th><th>Learning Objectives for Course Outcome 1</th></tr> <tr> <td>1. Understand additive manufacturing production lots, material and geometric complexity and part integration in additive manufacturing.</td><td> 1.1 Explain the differences between small lot and one-of-a-kind production in additive manufacturing. 1.2 Describe material complexity in additive manufacturing. 1.3 Describe geometric complexity in additive manufacturing. 1.4 Understand and explain part integration in additive manufacturing. </td></tr> <tr> <th>Course Outcome 2</th><th>Learning Objectives for Course Outcome 2</th></tr> <tr> <td>2. Understand and use solid modeling software for additive manufacturing.</td><td> 2.1 Understand and demonstrate creating solid models for additive manufacturing. 2.2 Understand the different files types to save solid models as for export to slicing software. </td></tr> <tr> <th>Course Outcome 3</th><th>Learning Objectives for Course Outcome 3</th></tr> </table> | Course Outcome 1 | Learning Objectives for Course Outcome 1 | 1. Understand additive manufacturing production lots, material and geometric complexity and part integration in additive manufacturing. | 1.1 Explain the differences between small lot and one-of-a-kind production in additive manufacturing. 1.2 Describe material complexity in additive manufacturing. 1.3 Describe geometric complexity in additive manufacturing. 1.4 Understand and explain part integration in additive manufacturing. | Course Outcome 2 | Learning Objectives for Course Outcome 2 | 2. Understand and use solid modeling software for additive manufacturing. | 2.1 Understand and demonstrate creating solid models for additive manufacturing. 2.2 Understand the different files types to save solid models as for export to slicing software. | Course Outcome 3 | Learning Objectives for Course Outcome 3 |
| Course Outcome 1 | Learning Objectives for Course Outcome 1 | | | | | | | | | | |
| 1. Understand additive manufacturing production lots, material and geometric complexity and part integration in additive manufacturing. | 1.1 Explain the differences between small lot and one-of-a-kind production in additive manufacturing. 1.2 Describe material complexity in additive manufacturing. 1.3 Describe geometric complexity in additive manufacturing. 1.4 Understand and explain part integration in additive manufacturing. | | | | | | | | | | |
| Course Outcome 2 | Learning Objectives for Course Outcome 2 | | | | | | | | | | |
| 2. Understand and use solid modeling software for additive manufacturing. | 2.1 Understand and demonstrate creating solid models for additive manufacturing. 2.2 Understand the different files types to save solid models as for export to slicing software. | | | | | | | | | | |
| Course Outcome 3 | Learning Objectives for Course Outcome 3 | | | | | | | | | | |

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



SAULT COLLEGE | 443 NORTHERN AVENUE | SAULT STE. MARIE, ON P6B 4J3, CANADA | 705-759-2554

| | 3. Understand and use slicing software. | 3.1 Develop and understanding of the slicing software. 3.2 Demonstrate the use of the slicing software to import solid models and prepare them for printing. 3.3 Understand and list various settings required to print successfully. | | | | | | | | | | | | |
|---|--|---|-----------------|-------------------|--------------------|-----|----------------------------|-----|--------------------|-----|-----------------|-----|-----------------|-----|
| | Course Outcome 4 | Learning Objectives for Course Outcome 4 | | | | | | | | | | | | |
| | 4. Understand and use the 3D printers at Sault College. | 4.1 Understand the describe the safe operation of the 3D printers at the college. 4.2 Understand and describe good maintenance practices with the 3D printers at the college. 4.3 Understand and demonstrate the operation of the 3D printers at Sault College by printing various solid models successfully. | | | | | | | | | | | | |
| Evaluation Process and Grading System: | <table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>Assignments & Labs</td><td>40%</td></tr><tr><td>Attendance & Participation</td><td>10%</td></tr><tr><td>Lab Practical Test</td><td>20%</td></tr><tr><td>Written Test #1</td><td>15%</td></tr><tr><td>Written Test #2</td><td>15%</td></tr></table> | | Evaluation Type | Evaluation Weight | Assignments & Labs | 40% | Attendance & Participation | 10% | Lab Practical Test | 20% | Written Test #1 | 15% | Written Test #2 | 15% |
| Evaluation Type | Evaluation Weight | | | | | | | | | | | | | |
| Assignments & Labs | 40% | | | | | | | | | | | | | |
| Attendance & Participation | 10% | | | | | | | | | | | | | |
| Lab Practical Test | 20% | | | | | | | | | | | | | |
| Written Test #1 | 15% | | | | | | | | | | | | | |
| Written Test #2 | 15% | | | | | | | | | | | | | |
| Date: | June 11, 2020 | | | | | | | | | | | | | |
| Addendum: | Please refer to the course outline addendum on the Learning Management System for further information. | | | | | | | | | | | | | |

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



SAULT COLLEGE | 443 NORTHERN AVENUE | SAULT STE. MARIE, ON P6B 4J3, CANADA | 705-759-2554