Module designation	**Vocational Mathematics** **Indonesian title:** *Matematika Kejuruan* **Course code:** 8420202111
Semester(s) in which the module is taught	Semester 4 (Second year)
Person responsible for the module	**Coordinator:** Dr. Endah Budi Rahaju, M.Pd. **Teaching staff:** Dr. Endah Budi Rahaju, M.Pd.; Yulia Izza El Milla, M.Pd; Dr. Abdul Haris Rosyidi, M.Pd.
Language	Indonesian
Relation to curriculum	Compulsory
Teaching methods	Interactive lectures using context-based learning, case-based learning, collaborative problem solving, technology- assisted exploration, group presentations, and an individual final project. **Media and tools:** Slides, LCD projector, UNESA Learning Management System (LMS), current Vocational School mathematics curriculum documents and textbooks, Google Docs, Google Sheets, Google Slides, Desmos, GeoGebra, Microsoft Excel, smartphones, and laptops.
Workload (incl. contact hours, self-study hours)	**(Estimated) total workload:** 2 CU × 170 minutes × 16 weeks = 5,440 minutes = 90.67 hours (≈ 3.18 ECTS) **Contact hours:** lectures, 2 × 50 minutes per week × 16 weeks = 26.67 hours (class hours per week: 340 minutes = 5.67 hours, including structured activities) **Private study including examination preparation:** structured assignments, 2 × 60 minutes per week × 16 weeks = 32.00 hours; independent study, 2 × 60 minutes per week × 16 weeks = 32.00 hours (total 64.00 hours)
Credit points	2 CU (3.18 ECTS) *1 CU = 170 minutes per week × 16 weeks = 45.3 hours; 1 ECTS = 28.48 hours (144 CU = 229 ECTS), so 1 CU = 1.59 ECTS (UNESA Rector's Decree No. 736/HK/KM/2023).*
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Programme learning outcomes (PLO) addressed:** • PLO-3: Develop logical, critical, systematic, and creative thinking in work within the relevant field of expertise and occupational competency standards. • PLO-6 : Master mathematical principles that support mathematical thinking and mathematical problem solving. • PLO-7: Master pedagogical knowledge for teaching and assessment aligned with curriculum and technological developments, realistic mathematics education, and edupreneur-leadership. • PLO-8: Demonstrate skills in designing, implementing, and evaluating adaptive, innovative, technology-supported mathematics learning. • PLO-10 : Make data-informed decisions in completing assigned tasks and evaluating completed work. **Course learning outcomes (CLO): after completing this module,**

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<tr><td></td><td>students are able to:
CLO-1: Analyze essential vocational secondary school mathematics content and collaboratively develop systematic, creative teaching alternatives, with or without technology, informed by recent research.
CLO-2: Identify mathematics topics that are difficult for SMK teachers to teach or students to learn, and collaboratively develop creative, technology-assisted instructional alternatives.
CLO-3: Identify types and potential mathematical misconceptions among vocational secondary school students and design evidence-informed strategies to address them.</td></tr>
<tr><td>Content</td><td>This course examines the essential mathematical concepts taught in Indonesian vocational schools and their connections to different vocational specializations and workplace practices. It covers numbers and exponents; sequences and series; financial mathematics (loans, investments, compound interest, and annuities); algebra, equations, and functions; geometry and trigonometry; data analysis, graphs, correlation, and regression; probability and combinatorics; and measurement error, accuracy, and precision. Students analyze subject-specific contexts, identify difficult content and possible student misconceptions, evaluate teaching alternatives, and develop contextual, technology- supported learning activities. Case studies, collaborative analysis, individual assignments, presentations, and a final instructional design project are used to develop vocationally relevant mathematics teaching that fosters higher-order thinking.</td></tr>
<tr><td>Examination forms</td><td>Final score is calculated from the weekly assessment scheme below (CLO/PLO addressed and weight of each assessment):<table><tr><th>Week</th><th>CLO</th><th>PLO</th><th>Weight (%)</th></tr><tr><td>1</td><td>CLO-1</td><td>PLO-3</td><td>3</td></tr><tr><td>2</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>3</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>4</td><td>CLO-1</td><td>PLO-3</td><td>5</td></tr><tr><td>5</td><td>CLO-1</td><td>PLO-3</td><td>5</td></tr><tr><td>6</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>7</td><td>CLO-1</td><td>PLO-3</td><td>5</td></tr><tr><td>8</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>9</td><td>CLO-3</td><td>PLO-3</td><td>12</td></tr><tr><td>10</td><td>CLO-1</td><td>PLO-3</td><td>5</td></tr><tr><td>11</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>12</td><td>CLO-1</td><td>PLO-3</td><td>5</td></tr><tr><td>13</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>14</td><td>CLO-3</td><td>PLO-3</td><td>5</td></tr><tr><td>15</td><td>CLO-2</td><td>PLO-3</td><td>5</td></tr><tr><td>16</td><td>CLO-1</td><td>PLO-3</td><td>20</td></tr></table></td></tr>
<tr><td>Study and examination requirements</td><td>Students pass the course when the final score is at least 55 (C). Assessment follows the 16-week distribution in the supplied RPS: weekly analyses and assignments (68%), an individual written test (week 9: 12%), and an individual final instructional-design project</td></tr>
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<td>(week 16: 20%), totalling 100%.
Final index (grade conversion):
<table>
<tr><th>Index</th><th>Converted score</th><th>Score range (A = final score)</th></tr>
<tr><td>A</td><td>4.00</td><td>85 ≤ A ≤ 100</td></tr>
<tr><td>A-</td><td>3.75</td><td>80 ≤ A < 85</td></tr>
<tr><td>B+</td><td>3.50</td><td>75 ≤ A < 80</td></tr>
<tr><td>B</td><td>3.00</td><td>70 ≤ A < 75</td></tr>
<tr><td>B-</td><td>2.75</td><td>65 ≤ A < 70</td></tr>
<tr><td>C+</td><td>2.50</td><td>60 ≤ A < 65</td></tr>
<tr><td>C</td><td>2.00</td><td>55 ≤ A < 60</td></tr>
<tr><td>D</td><td>1.00</td><td>40 ≤ A < 55</td></tr>
<tr><td>E</td><td>0.00</td><td>0 ≤ A < 40</td></tr>
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<td>Reading list</td>
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1. Dooley, W. H. (1915). Vocational mathematics . D. C. Heath & Company.
2. Fatimah, A. T. (2022). Matematika kejuruan menuju merdeka belajar . Deepublish.
3. Kreyszig, E., Kreyszig, H., & Norminton, E. J. (2011). Advanced engineering mathematics (10th ed.). John Wiley & Sons.
4. Tussy, A. S., Gustafson, R. D., & Koenig, D. R. (2011). Basic mathematics for college students (4th ed.). Brooks/Cole, Cengage Learning.

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