**Confusion Matrix Normalized:**

- Diagonal elements show high true positive rates for "helmet" (1.00) and "no-helmet" (0.98) classes, indicating accurate classification.

- Low off-diagonal elements suggest the model effectively distinguishes between helmet, no-helmet, and background classes.

**Confusion Matrix:**

- 78 true positives for "helmet" class, 0 false negatives, indicating excellent helmet detection.

- 103 true positives for "no-helmet" class, but 11 false positives, suggesting occasional misclassification of background as no-helmet.

- Low background class count (5) shows the model separates helmet/no-helmet from background well.

**Precision-Confidence Curve:**

- "Helmet" and "no-helmet" classes achieve ~0.98 precision at 1.00 confidence threshold.

- Overall, the model maintains 0.981 precision across all classes at 1.00 confidence.

**Recall-Confidence Curve:**

- "Helmet" and "no-helmet" classes reach ~0.88-0.90 recall at 1.00 confidence.

- Model achieves 1.00 recall across all classes at a very low 0.000 confidence threshold.

**F1-Confidence Curve:**

- "Helmet" and "no-helmet" classes have ~0.93-0.94 F1-score at 1.00 confidence.

- Overall F1-score of 0.96 across all classes at 0.435 confidence.

**Precision-Recall Curve:**

- "Helmet" and "no-helmet" classes show ~0.98 and ~0.97 precision-recall performance.

- Overall mean average precision (mAP@0.5) of 0.978 across all classes.

Overall, the analysis demonstrates your YOLOv11 model's strong performance in accurately detecting and classifying helmet and no-helmet objects, with high precision, good recall, and a balanced F1-score. The steady improvements in training metrics further indicate the model is well-optimized for the task.