We use an alphabet composed of a blank space and the 26 letters of the English alphabet.

$n = 27, m = 2$

We will use as key the assignment number and current date: $1, 23, 10, 13$

$$K = \begin{pmatrix} 1 & 23 \\ 10 & 13 \end{pmatrix}$$

The plaintext is SZABO, which is numerically: $19, 26, 1, 2, 15$. Because it has an length that is not a multiple of m, we pad it with a space character.

$P = (19, 26), (1, 2), (15, 0)$

To encrypt we multiply modulo 27 K with each group of two letters from the plaintext:

$$\left[\begin{pmatrix} 19 & 26 \end{pmatrix} \begin{pmatrix} 1 & 23 \\ 10 & 13 \end{pmatrix} = \begin{pmatrix} 9 \\ 19 \end{pmatrix}, \begin{pmatrix} 1 & 2 \end{pmatrix} \begin{pmatrix} 1 & 23 \\ 10 & 13 \end{pmatrix} = \begin{pmatrix} 21 \\ 22 \end{pmatrix}, \begin{pmatrix} 15 & 0 \end{pmatrix} \begin{pmatrix} 1 & 23 \\ 10 & 13 \end{pmatrix} = \begin{pmatrix} 15 \\ 21 \end{pmatrix} \right]$$

Converting $9, 19, 21, 22, 15, 21$ to our alphabet, we get that the ciphertext is ISUVOU.

For decryption we need the decryption key, which is the inverse of our encryption key. Using Cramer's rule:

$$K^{-1} = (1 \cdot 13 - 23 \cdot 10)^{-1} \begin{pmatrix} 13 & -23 \\ -10 & 1 \end{pmatrix} = 26 \begin{pmatrix} 13 & -23 \\ -10 & 1 \end{pmatrix} = \begin{pmatrix} 14 & 23 \\ 10 & 26 \end{pmatrix}$$

To decrypt the cyphertext, we multiply the decryption key with each group of two letters from the cypertext:

$$\left[\begin{pmatrix} 9 & 19 \end{pmatrix} \begin{pmatrix} 14 & 23 \\ 10 & 26 \end{pmatrix} = \begin{pmatrix} 19 \\ 26 \end{pmatrix}, \begin{pmatrix} 21 & 22 \end{pmatrix} \begin{pmatrix} 14 & 23 \\ 10 & 26 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 15 & 21 \end{pmatrix} \begin{pmatrix} 14 & 23 \\ 10 & 26 \end{pmatrix} = \begin{pmatrix} 15 \\ 0 \end{pmatrix} \right]$$

The result is SZABO_, which is what we encrypted in the first place, with the trailing space.